STEEL

The

Metalworking Weekly

JULY 18, 1960

A PENTON PUBLICATION

Aluminum's Little Three Go to Bigger Markets

The nation's younger aluminum producers, the "Little Three," think they're set to grow after a wobbly start. A. P. Cochran, president of one of them—Anaconda Aluminum Co.—says they'll do it with full integration, greater distribution, and further expansion. The three have annual capacities totaling 300,000 tons. The whole industry's capacity is about 2.4 million tons. Several more companies are watching the "Little Three" progress and may become primary producers if Anaconda, Harvey Aluminum Inc. and Ormet Corp. are successful in stepping up sales to metalworking. For the rundown on aluminum's "Little Three" prospects turn to Page 51.

Automated Line Phosphates Bearings, Insures Longer Shelf Life

Vinyl Clad Metal Takes Draws, Heat

Scrap Firms Resist Standby Status

MATERIALS EFFICIENCY

How to Buy Creatively

No. 15 in STEEL's Program for Management

CONTENTS—TURN PAGE

FOR AVAILABILITY SERVICE QUALITY SPECIFY

B&W *Job-Matched stainless tubing*

You're assured these important advantages:

- **Availability:** A nationwide network of district sales offices and steel service centers, plus 2 B&W mills—each equipped to serve you promptly from a broad range of tube sizes, grades and finishes.
- **Service:** B&W's thorough understanding of process industry requirements makes possible sound engineering assistance on all types of tube applications.
- **Quality:** Comprehensive quality control assures uniformity of tube properties and conformity to specifications on every order. All tubing is carefully matched to your fabricating and end-product requirements.

These are just a few of the many reasons why it pays to specify B&W Job-Matched Stainless Tubing. And remember—matching tubes to jobs assures you the *right tube,* in the *right quantity,* at the *right time.* For more information call your local B&W District Sales Office, or write for Bulletin TB-410. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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B&W THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

This Week in STEEL

the Metalworking Weekly

July 18, 1960 Vol. 147 No. 3

Data Processing Equipment for Hire at Clerk's Wages

For the price of a clerk—about $345 a month—you can rent data processing equipment that will give you more information and greater efficiency than ever before. Makers of data processing equipment are concentrating on the smaller buyer in strategy that will push sales to a record $1.5 billion in 1960 compared with $1 billion in 1959. Electronic computers pay off for a small company when applied to businesses that involve a lot of processing, paperwork, or engineering. PAGE 54

How to Buy Creatively

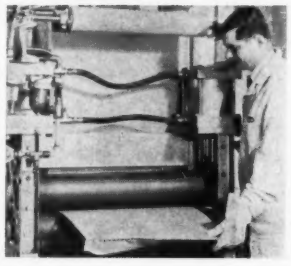
To buy creatively, you need the right climate, the right people, and the right direction for your efforts. Creative buying will bring materials efficiency. And only greater efficiency can meet the triple threat of inflation, spiraling wages, and adverse trade trends. Materials are a good road to productivity because they account for half your costs. This is the second in a 13 part series which started July 4 and will run every other week for the rest of the year. It's a companion to the series on production efficiency which appeared in the first half. PAGE 61

Automated Line Phosphates Bearings

Corrosion protection for roller bearings used on railroad rolling stock is insured by an automated phosphating line installed at the Columbus, Ohio, plant of Timken Roller Bearing Co. Designed by Timken engineering personnel and built by Detrex Corp., Detroit, at a cost of $64,000, the line processes 160,000 bearings a year. Parts run through 33 cycles in about 49½ minutes. PAGE 86

Fabricator Develops Improved Vinyl-Metal Laminate

New design possibilities have been opened up for users of vinyl-metal laminates. As the result of three years' research, Simoniz Co. has licked forming and heat problems that have limited the use of conventional laminates. The new material can be drawn to depths up to nine times the corner radius. Vinyl, fed from an overhead roll, is applied to cleaned, Bonderized, and adhesive-coated metal (photo). PAGE 92



Scrap Firms Resist Standby Status

Shrinking demand for purchased scrap in steelmaking is threatening to reduce the scrap industry to standby status in the economy. Scrap processors and dealers are fighting to prevent further deterioration of their standing as suppliers of a vital raw material in steel production. They're actively building their defenses, promoting an intensive research program aimed at providing the basis for recouping losses resulting from technological changes in steelmaking. PAGE 125

COMPLETE CONTENTS ▶

CONTENTS

Metalworking Week, Page 41

The Editor's Views—Economic Illiteracy! 47
Aluminum's "Little Three" Go to Bigger Markets 51
Data Processing Equipment for Hire at Clerk's Wages 54
Steel Tries New Tack in Building Homes—Faster, less expensive .. 56
Power Mower Maker Sharpens Engineering—Sets up new staff 57
Materials Efficiency—How to Buy Creatively 61
No. 15 in STEEL's Program for Management for 1960
J&L Starts Operations at Ore Mine in Mesabi Range 80

Technical Outlook, Page 85

Automated Line Phosphates Bearings—It's hydraulically operated .. 86
Truck Frame Fabrication Speeded by 200 ipm Welds 88
Machine Topics—Tool Builders May Sell More to Russia 89
Product, Power Contracts Insure Business Stability 90
Core Design Permits Smaller Transformers—Has other advantages . 91
Improved Vinyl-Metal Laminate Opens New Design Possibilities ... 92
Progress in Steelmaking—Oxygen Boost to Increase Steel Output .. 94
Cold Heading Process Trims Part Costs—GM division makes change 99
Test of Diamond Abrasive Needles Shows Advantages 102
Automation Speeds Paint Dipping Line at Tappan 104

Market Outlook, Page 123

Complete Index to Market News and Prices 123
Scrap Firms Resist Standby Status—Seek to recoup losses 125
Some Steel Products Buck the Downtrend 128
Steelworks Operation Chart and District Ingot Rates 130
First Half Steel Output Third Highest on Record 130
Scrap Index Rises on Limited Buying—Composite up 34 cents 143
Nonferrous Metals—Premiums on Zinc Lowered 146
Standard and Line Pipe Prices to Jobbers Cut 150

WHERE TO FIND

Servicenter 5
Calendar of Meetings 10
Editorial & Business Staffs 16
Metalworking Pulse 44
Windows of Washington .. 58
Mirrors of Motordom 67
The Business Trend 71
Men of Industry 75
Obituaries 78
New Products 107
New Literature 121
Advertising Index 151

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Now 6 out of 7 ironing "boards" are made of sheet steel

Just fifteen years ago, all but 15 per cent of ironing boards were made of wood. Today, it's the other way around: 6 out of 7 are made of strong, durable, inexpensive sheet steel, with features that could never be achieved with wood.

"The Mary Proctor Hi-Low Ironing Table" shown here is a good example. Its steel top is pleated for extra strength, with steam vents that channel heat away from the ironer's lap for cooler ironing. Sturdy tubular legs rolled from sheet steel are light in weight yet provide solid support.

Bethlehem furnishes large tonnages of cold-rolled steel to the Proctor-Silex Corporation, makers of the "Mary Proctor Hi-Low Ironing Table."

If you work with steel sheets—hot-rolled, cold-rolled, or galvanized—you can always count on Bethlehem sheets for completely dependable performance. Our engineers will be glad to discuss your sheet-steelworking problems with you.

Steel

For strength
. . . economy
. . . versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Distributor: Bethlehem Steel Export Corporation*

BETHLEHEM STEEL

BETHLEHEM STEEL

When you see an eight-eyed spider...

call an *ARANEOLOGIST*

(specialist in spiders)

when you've got welding problems... call in *LINCOLN*

(specialists in arc welding)

A SOUTHERN sheet metal fabricator had "burn-thru" in the welds. The LINCOLN Field Engineer recommended Fleetweld 37 and licked the "burn-thru" problem. But more important, the new electrodes increased welding speeds to such an extent that overall costs dropped a third.

And right there is a good reason for doing business with LINCOLN. Ideas to whip knotty production problems come naturally to the Field Engineers. They are factory-trained where they—and everyone else—gets paid according to his individual contribution to the company's goal—superior products and service to you at continually decreasing costs. So, while he knows welding, he also understands how to relate it to your total manufacturing operation.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

THE LINCOLN ELECTRIC COMPANY
Dept. 2920 • Cleveland 17, Ohio

LINCOLN ELECTRODES

Held down "impossible" job for months vs. days

They were asking the "impossible" at this big West Coast mine. The hose used in their big beneficiation plant must be tough enough to handle the flow of murderously abrasive iron-ore slurry. Yet it still must be flexible enough to follow a twisting, bending course down from the top of the seven-story structure.

So it's little wonder their first hose sprang numerous leaks almost immediately – was finished completely in about 45 days. It wasn't until the G.T.M. – Goodyear Technical Man – recommended his special ore-carrying hose that they got satisfactory service.

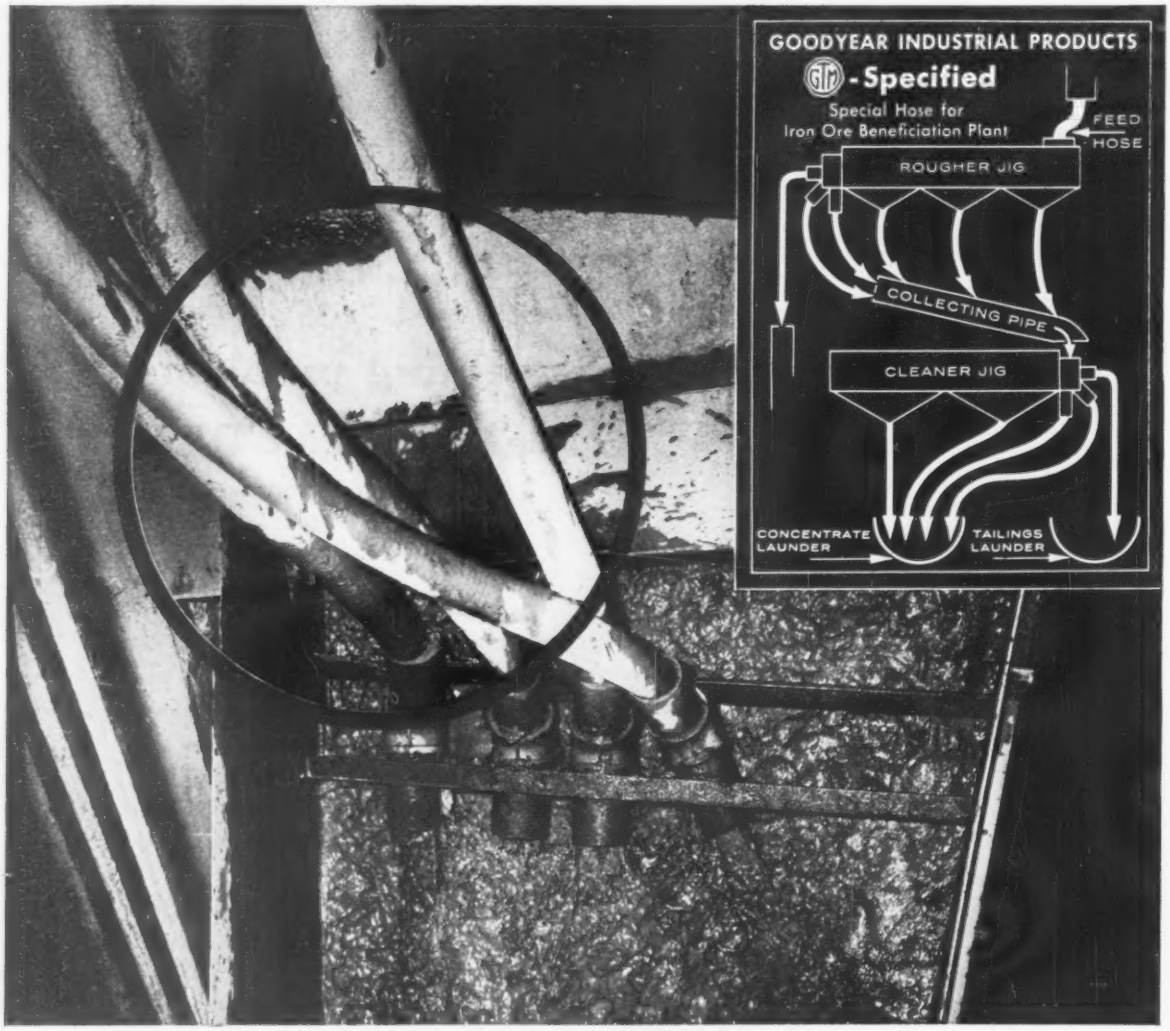
In fact, the G.T.M.'s hose has been so successful that the company's purchased over 4,000 feet of it to date.

It's been on the job over 12 months now – completely mastering this extra-tough job.

So once again, the G.T.M. has proved that the "impossible" often boils down to right hose – and the right recommendation. Make sure you get both–by contacting your Goodyear Distributor – or writing Goodyear, Industrial Products Division, Akron 16, Ohio.

• • •

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on V-Belts, Hose, Flat Belts and many other industrial rubber and non-rubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*



HOSE FOR ALL INDUSTRY BY

GOODYEAR

THE GREATEST NAME IN RUBBER

Throw Away That Abacus

Does the teen-age genius in your family test your acumen by rattling off free wheeling terms such as binary coded decimal, mnemonic code, binary digit, and radix?

If you feel snowed, then it's time to brush up on your "computerese," warns Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Pa. The firm has published a 22 page glossary intended to make computer language more intelligible to the layman. It's called "Do You Talk 'Computerese?'" and it defines 82 terms which could help you avoid wearing a baffled look when conversations drift around to computers. It helped us regain a little stature around the house.

We found out that a binary coded decimal is a system of representing decimal numbers; a mnemonic code is a list of instructions written in an easily remembered form for computer programers; a binary digit is used in converting a decimal number into a binary number; and a radix is a numbering system's base.

While We're on the Subject . . .

. . . you might take a gander at two articles in this issue. In one, Pittsburgh Resident Editor Bill Wallace tells "How Much Data Processing You Can Buy for $300." In the other, the second in our Materials Efficiency series, you'll find an easy to read exhibit showing computers and their uses. Editors John Morgan and George Howick produced the "How to Buy Creatively" article.

The three editors did dandy jobs of translating technical lingo and interpreting the facts. As a matter of fact, a computer is defined as any device capable of performing calculations, i.e., carrying out transformations of information. We're going to risk receiving some hollers from humanists and say the foregoing definition might also apply to editors.

Comments from a Founder

"Our compliments on 'Ford Tells How It Trimmed Costs on Falcon Engine,' (STEEL, May 30, pp. 51-52), writes J. Douglas James, vice president & general manager, Urick Foundry Co., Erie, Pa.

"As producers of gray iron castings, we appreciate articles (which) help suppress the feeling in metalworking that gray iron is fast becoming an obsolete engineering material. We believe that if more users approached the problem as Ford did, they would be able to take advantage of the engineering properties of gray iron castings and benefit from the lower costs.

"Please send reprints for mailing by our sales department."

Clocking an Industry's Pace

A couple of months ago, Allen F. Hobbs, Industrial Products Div., Boeing Airplane Co., Seattle, wrote to the editors about the headline, "Turbines Trudge On," which appeared in our 1960 yearbook. Said he: "From one point of view (passenger car), this title might be apt, but we feel the small gas turbine has at least moved into a fast walk and will soon move up to a trotting pace . . ."

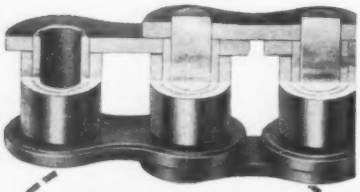
That note caught the editors' interest and Assistant Editor Derry Eynon was assigned to find out what's happening in the gas turbine field.

In a survey, Derry found turbinemakers' most promising prospects are in special purpose uses

like this earth moving Allis-Chalmers experimental crawler tractor (one of the world's largest) which is powered by a Boeing gas turbine. Aircraft, marine, pump, generator drives, nuclear power, missile equipment, fire trucks, and off the road vehicles are cited as comers.

Derry also reports that seldom has he had such candid replies, pro and con, to survey questions. One maker said: "We're somewhat in the position the reciprocating engine makers were in dur-

MAXIMUM
WEARING SURFACES
for longer chain life



ACME'S SECRET
for years of additional service

Special hardening of pins, bushings and rollers help insure maximum life expectancy of ACME Roller Chains. All parts subjective to articulation have glass-hard wear-resistant surfaces to render eminent life expectancy. The side plates or links which act as connecting members for articulating parts are specially heat treated and tempered to insure great strength and ductility.

Maximum hardening of all wearing surfaces on ACME Chains is conducive to longer life, resulting in greater economy and lower maintenance cost.

Your local distributor has a complete line of ACME Chains and Accessories on hand for immediate delivery. Call him.

Write Dept. 10R for new 100-page Illustrated Catalog, including new engineering section showing diagrams of 36 methods of chain driving.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

ing initial competition with the horse . . . Education of buyers is needed . . . The last 17 years we have spent on small gas turbine research, development, and production has not been an engineering exercise. We expect the field to broaden in a short time."

Get the full story in next week's issue.

Miss Royal, Take a Letter . . .

. . . Make it an open letter to all readers of STEEL.

The other day we received a phone call from a friend who asked for a dozen tearsheets of an article from STEEL. Because the article was from a recent issue, we asked him: "Bill, you'll undoubtedly use these copies in your job, so why don't you write up the use and enter our Usership contest?" Bill replied that he had read about the contest—a guy could pick up $1000 in it couldn't he? "Just might enter," said he.

A few weeks went by and no entry from Bill.

One night, at a party, we found Bill wrapping himself around a cocktail and jawing about the high cost of living. Seizing the opportunity, we jumped into the conversation with: "We can't lower your cost of living, but you might have raised your income by entering our Usership contest."

You know what he said? "I can't write and I thought you would laugh at my schoolboy efforts."

My reply: "Style and polished phrases aren't necessary—the idea's the thing!" And that it is. (End of letter.)

Here's how . . .

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—July, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

You can enter as many times as you wish. Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Sept. 1.**

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

With slabbers, the cooler the rolls, the longer they last

We have been somewhat concerned during the last year or so by what seems to us a more than normal number of premature roll failures in universal slabbing mills. These failures have not been limited to any one brand of rolls.

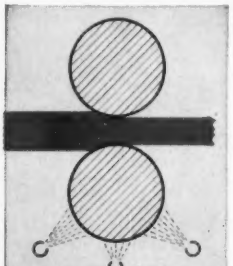
As a result, we have been checking among the many users of universal slabbers of our acquaintance, and in particular, with the operators whose mills have been giving them good outputs between roll replacements.

We think we have the answer to part of the problem, and will pass it along to you. Even if you don't operate a slabbing mill, you may find it helpful in connection with hot mill operation in general.

Not enough water. In every troublesome case that has come to our attention, too little cooling water was reaching the bottom roll, either because of an inadequate cooling system, or clogging of the spray header. Here is the way two steel plants are currently taking care of the problem:

CASE A: Water is applied to the top roll by means of a water box, with wipers on both entry and delivery sides. Three 4-inch pipes spray the bottom roll, one directly beneath the roll and the other two on the entry and delivery sides. When this mill was first installed, it had only one pipe directly beneath the bottom roll, which resulted in frequent roll breakage.

This mill is particularly careful about bringing the rolls up to working heat before beginning production. Standard practice is to pass two ingots three or four times through the mill, taking very mild reductions, with the water valves opened only half way. The two "start-up" ingots are then sent back to the soaking pit, the water is turned up to full pressure and a new, hot ingot is brought up to start the turn's regular production run.



Good blooming and slabbing mill roll-cooling arrangement utilizes two or more water lines to the bottom roll, which is usually the first to show signs of premature failure.

CASE B: This mill as delivered had only one spray header underneath the bottom roll. Bad fire cracking and roll breakage occurred almost from the day the mill was placed in production. Study of the mill showed that scale was lodging between the water pipe and the bottom roll, so that little if any cooling water was reaching the roll. Two additional water lines were brought in, each delivering its water about half way up the side of the roll. The general problem has been effectively solved by this expedient. Today, this mill at times rolls up to 140,000 tons before the rolls are redressed although normal practice is to change rolls after approximately 75,000 tons.

This is the mill described in Case A; it has an excellent record, thanks to careful control of heat in the rolls and the avoidance of sudden temperature changes.

Mack-Hemp has evolved a number of roll analyses that are especially good for slabbing and blooming work because of their combination of strength and resistance to fire cracking. Mack-Hemp *Technalloy* rolls cast from chrome-moly steel and specially heat treated offer excellent resistance to fire cracking and breakage under the most severe operating conditions. Mack-Hemp *Superalloy,* a nickel-chromium-molybdenum steel roll, turns in outstanding performance in blooming mills where side wear and fire cracking in the passes has been severe.

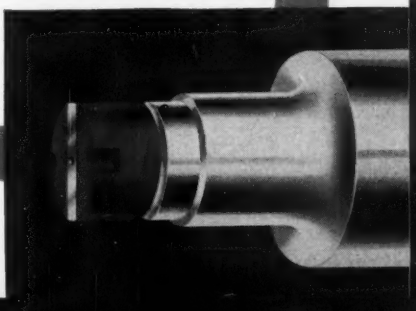
Whatever your problem of roll use, you'll find that Mack-Hemp can provide useful advice or helpful suggestions. We've been accumulating data on roll performance for more than a century and a quarter . . . it's yours for the asking. 'Phone or write us at any time.

MACKINTOSH-HEMPHILL

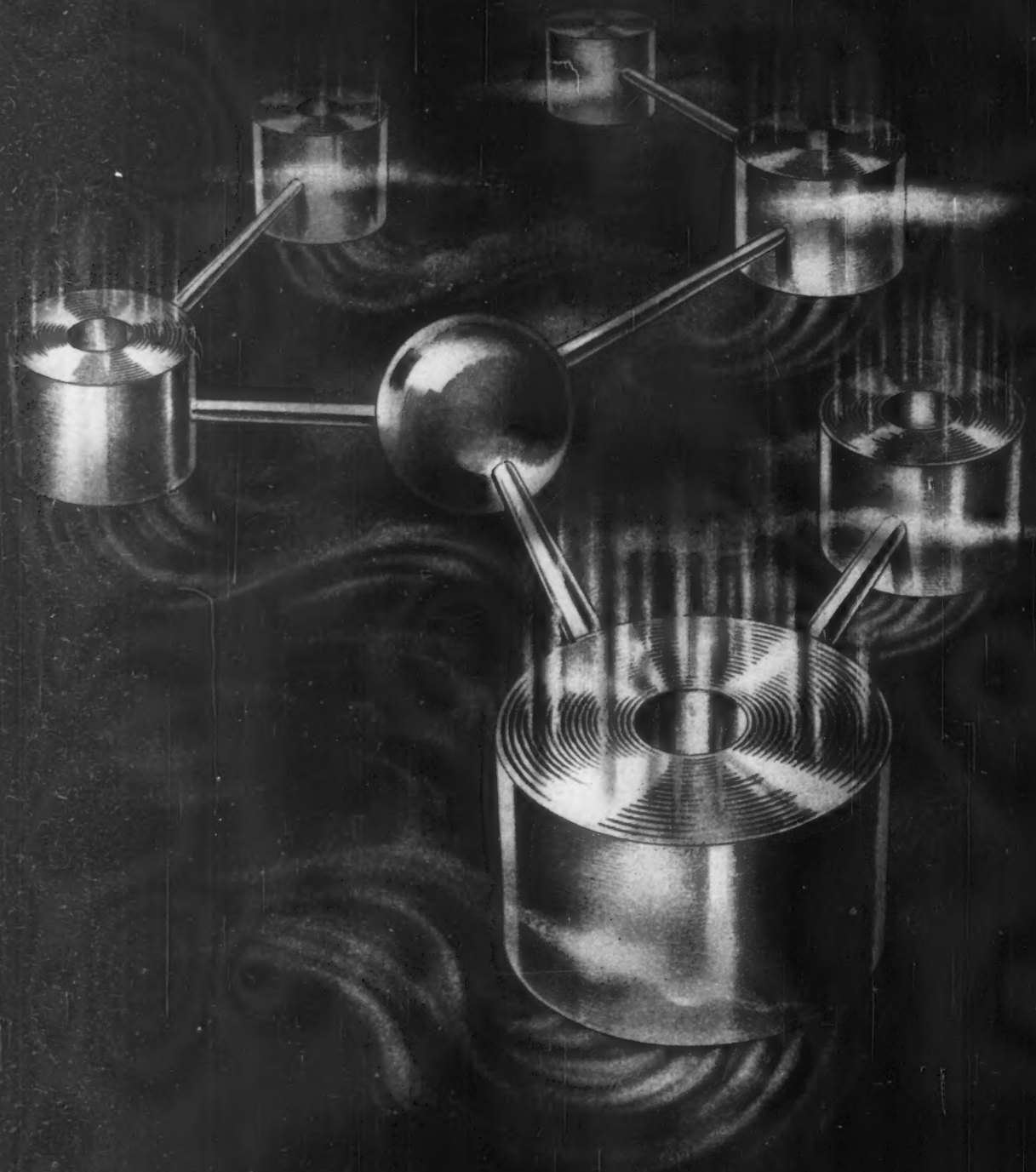
You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



Dramatic new method of alloying called. .



. . . THE GREATEST ADVANCE IN STEEL MAKING IN A DECADE

Lee Wilson Open Coil Process of Gas Alloying advances an entirely new concept in steel chemistry!

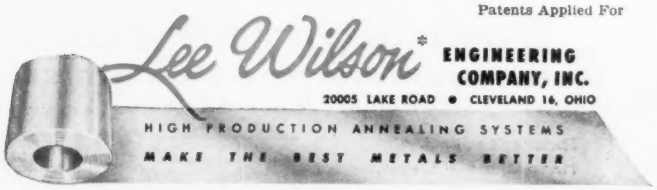
Now for the first time it is economically feasible to gas alloy steel in coil form at the annealing station. Lee Wilson engineers have successfully added or removed nitrogen and carbon by introducing gaseous elements during the annealing period. This opens up a whole new concept of steel alloying which will increase rolling mill efficiency, improve alloy uniformity, and save steel makers millions of dollars annually.

How It Works—Long a theory, gas alloying became possible when Lee Wilson engineers developed the first successful method for opening and handling opened coils at production rates. By threading a nylon cord or metal tape between each lamination of the coil, the coil is "opened" with an air space between each wrap. Thus the entire surface of the coil is open to special atmospheres which can be introduced during the annealing cycle, and any gas equilibrium reaction that exists within the area of the steel is at the correct temperature level for the constituents of the atmosphere gas and the interstituals in the steel. It is this compatibility of heat, atmosphere and steel composition that makes gas alloying possible.

Field Tests Show Vast Potential—Already actual field tests have shown that the Lee Wilson Process of Gas Alloying can produce a non-aging rimmed steel by reducing carbon and nitrogen. It also creates a vastly improved enamel iron product. By controlling the carbon content and grain structure in rimmed steel, a superior material for extra deep draw galvanized stock is produced. The removal of carbon and nitrogen in rimmed steels produces a strip of exceptional uniformity that can be substituted for low grade silicon sheet for motor laminations, and by reducing the carbon content in silicon sheet the electrical characteristics and surface conditions are substantially improved. By reversing the process, carbon and nitrogen can be restored to the steel in any desired quantities. By using the Open Coil Process, the Bessemer process can now produce sheet steels of equal quality to the open hearth process. This could save as much as 20% in the cost of many grades of sheet steel. At the coiling station such jobs as cleaning and inspection can be performed easily and automatically. Imaginative engineers and metallurgists immediately see many other advantages—many of which are undergoing tests in one or more of the pilot units now in the field. The potential of this new system now appears almost limitless.

How To Learn More About It—There is little wonder that an executive of one of the nation's leading steel makers called it "the greatest advance in steel making in the past decade" If you are not up to date on the Lee Wilson Open Coil Process of Gas Alloying why not let us arrange to have a Lee Wilson engineer meet with you at your convenience. We will have full particulars at our Booths 78,79 at the AISE Annual Convention and Iron and Steel Exposition in September. A full description, together with an animated motion picture, has been scheduled as a part of the program. Check your show schedules and plan now to attend.

Patents Applied For


Lee Wilson* ENGINEERING COMPANY, INC.
20005 LAKE ROAD • CLEVELAND 16, OHIO
HIGH PRODUCTION ANNEALING SYSTEMS
MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF OPEN COIL AND SINGLE STACK FURNACES

JF SERIES

EASY SAFE EFFICIENT LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

DUFF-NORTON COMPANY

COFFING HOIST DIVISION • Pittsburgh, Pa.

COFFING HOISTS

Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS

Ratchet • Screw
Hydraulic • Worm Gear

CALENDAR
OF MEETINGS

July 22-24, National Association of Metal Finishers: Annual meeting, Statler-Hilton Hotel, Los Angeles. Association's address: 60 Bently Rd., Cedar Grove, N. J. Executive director: P. Peter Kovatis.

July 24-28, American Electroplaters Society: Annual meeting, Statler-Hilton Hotel, Los Angeles. Society's address: 445 Broad St., Newark 2, N. J. Executive secretary: John P. Nichols.

Aug. 8-12, American Institute of Electrical Engineers: Pacific general meeting, U. S. Grant Hotel, San Diego, Calif. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Aug. 15-17, American Society of Mechanical Engineers and American Institute of Chemical Engineers: Heat transfer conference and exhibit, Statler-Hilton Hotel, Buffalo. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Aug. 16-19, Society of Automotive Engineers Inc.: National West Coast meeting, Jack Tar Hotel, San Francisco. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 3-4, American Machine Tool Distributors Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Sept. 6-16, National Machine Tool Builders Association: The Machine Tool Exposition — 1960, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 6-16, Production Engineering Show: Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 7-9, American Society of Mechanical Engineers: Instruments and regulators conference, Massachusetts Institute of Technology, Cambridge, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 7-15, Coliseum Machinery Show: Coliseum, Chicago. Information: A. Byron Perkins & Associates, 2807 Sunset Blvd., Los Angeles 26, Calif.

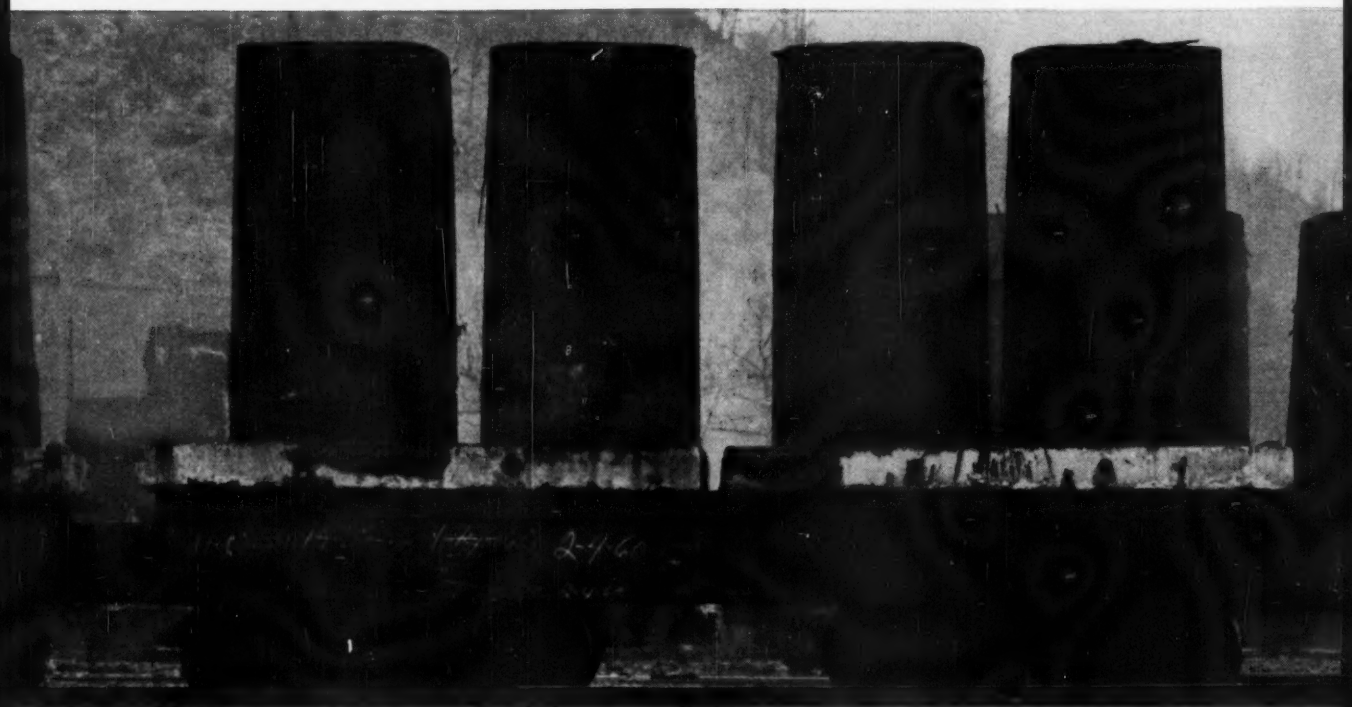
Sept. 12-13, Industrial Truck Association: Fall meeting, Cavalier Club, Virginia Beach, Va. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Are you satisfied with your ingot car maintenance costs?

This mark tells you a product is made of modern, dependable Steel.

These rugged 8-wheel Ingot Mold Cars haven't had one single repair job since they were bought *six years ago!* Yet they work like new. Each car is designed with an all-welded steel body that offers long life and dependable service. United States Steel has the facilities, the skilled engineers and the technical know-how to build *strong* industrial cars. You give us your specifications and requirements, and we'll design for you the finest industrial cars in the world. We would appreciate an opportunity to discuss this personally and in greater detail. To arrange a meeting write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. or any of our District Offices.

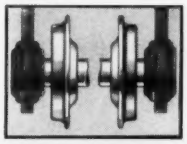
USS is a registered trademark



Here's how (USS) Industrial Cars are built better:

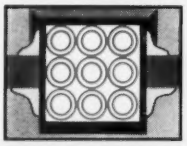
ANTI-FRICTION OUTBOARD BEARINGS:

High-capacity anti-friction bearings are located outside each of the car's eight wheels to minimize sidesway and to provide long, smooth-running performance.



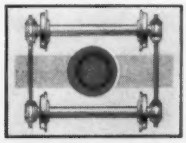
SEVENTY-TWO COIL SPRINGS:

Eighteen coil springs on each side of both trucks provide a total of 72 separate springs for a shock-absorbed level ride.



HIGH ENGINEERING SAFETY FACTOR:

Designed for a 200-ton normal capacity load —including ingots, molds and stools —each car has a substantial built-in safety factor to withstand maximum ingot-stripping thrusts.



OVERSIZE CENTER PLATES:

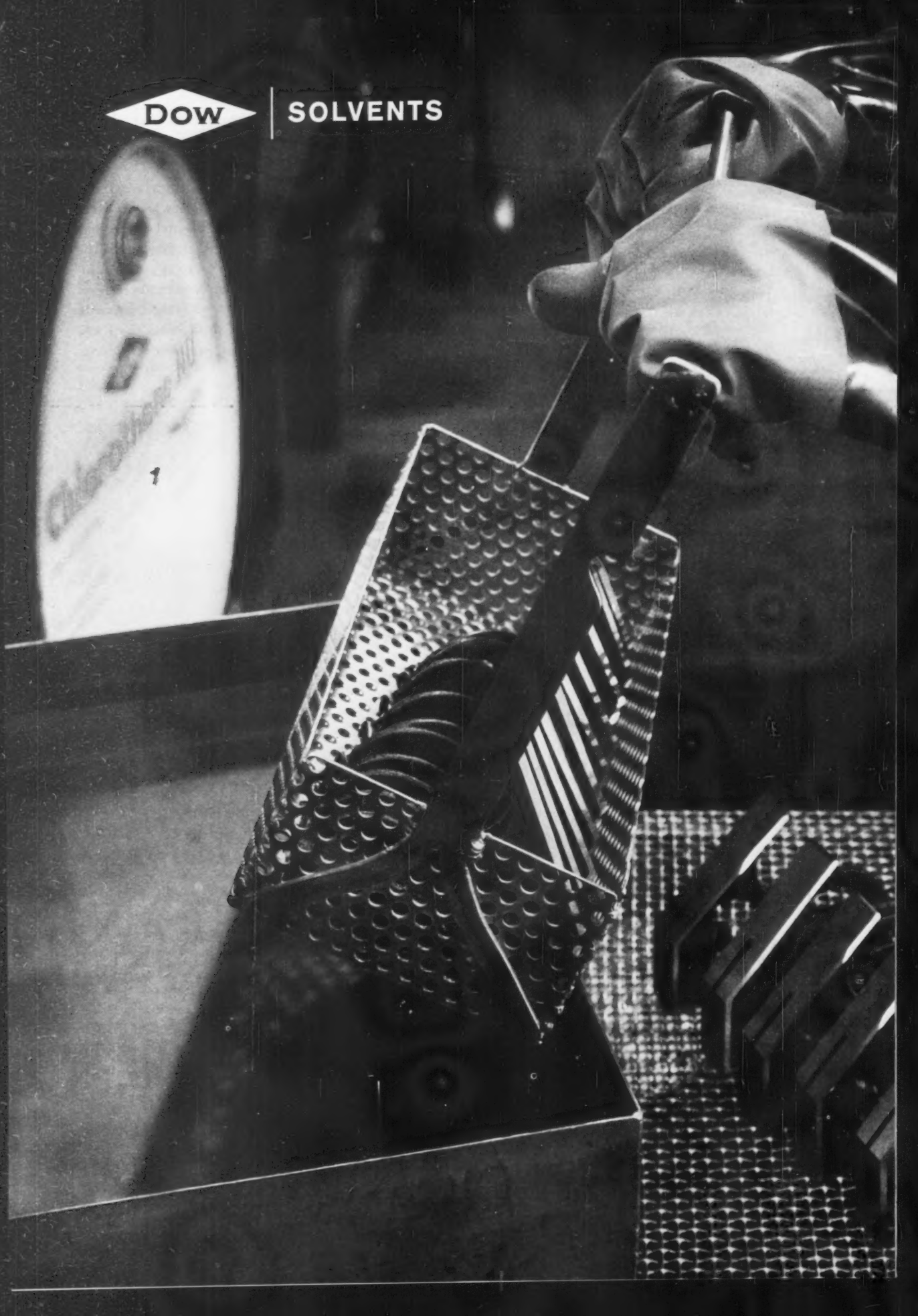
"Beefed-up" center plates between the trucks and car body are 18 inches in diameter—compared with the conventional 12 inches—to reduce the load per square inch on their surfaces.

HOT-METAL SHIELDS:

Curved end plates, long side skirts, and special drip shields protect the couplers, bearings and springs from runover molten metal and troublesome solidified drippings.

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel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SOLVENTS

ANNOUNCING...

Chlorothene NU

New stabilizer system solves corrosion problems—makes recovery easy!

Newly developed Chlorothene® NU combines high solvency and safety with an advanced stabilizer system that makes possible an extraordinary range of cold-cleaning applications—makes recovery easy, too!

The exceptional stability of Chlorothene NU (specially inhibited 1,1,1-trichloroethane) practically eliminates corrosion of sensitive metals. You can use it for cleaning aluminum, zinc, and white-metal alloys—as well as other metals, many plastics, rubber products and other materials.

Because increased stability makes recovery easy and practical, you can enjoy the economy of using Chlorothene NU over and over again. In most cases, existing equipment, such as a trichloroethylene still, does an excellent job.

Safe two ways! Low in toxicity, Chlorothene NU has a maximum allowable vapor concentration of 500 parts per million. That's closely comparable to many flammable solvents and is substantially more favorable than most chlorinated solvents. In addition, Chlorothene NU has no fire or flash point, as measured by standard methods. These features not only make Chlorothene NU safer to use—they simplify new cleaning systems and waste disposal.

COLOR CODED—For easy identification, even from 100 feet away, drums of Chlorothene NU are distinctively color-coded in green and white. For more information about Chlorothene NU, call your distributor of Dow solvents. He knows all about its use, recovery and comparative cost. Or contact your nearest Dow sales office.

THE RIGHT SOLVENT FOR THOUSANDS OF INDUSTRIAL USES. Not only is Chlorothene NU recommended for cold-cleaning dip operations on the production line—it also cleans by spray, bucket or wipe methods. It's an all-purpose solvent for many applications, both on the production line and for maintenance use.

SEE YOUR DISTRIBUTOR OF DOW SOLVENTS FIRST!

The widest line of industrial solvents: Trichloroethylene, Perchloroethylene, Methylene Chloride, Chlorothene NU.

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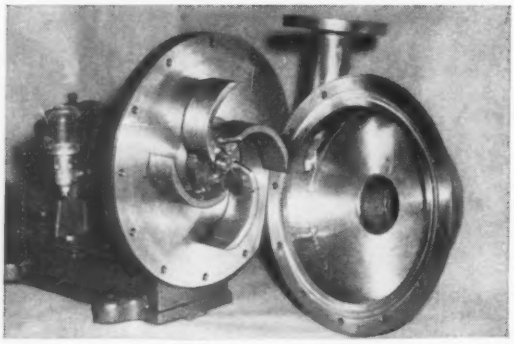
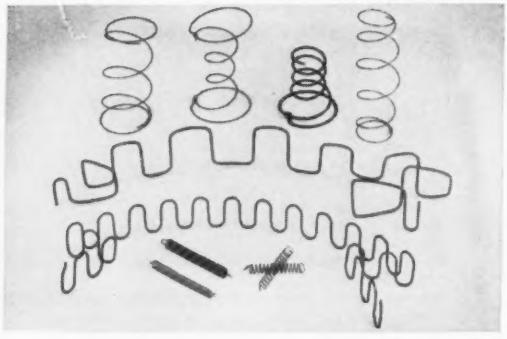
USING REPUBLIC HIGH-PRODUCTION STEELS



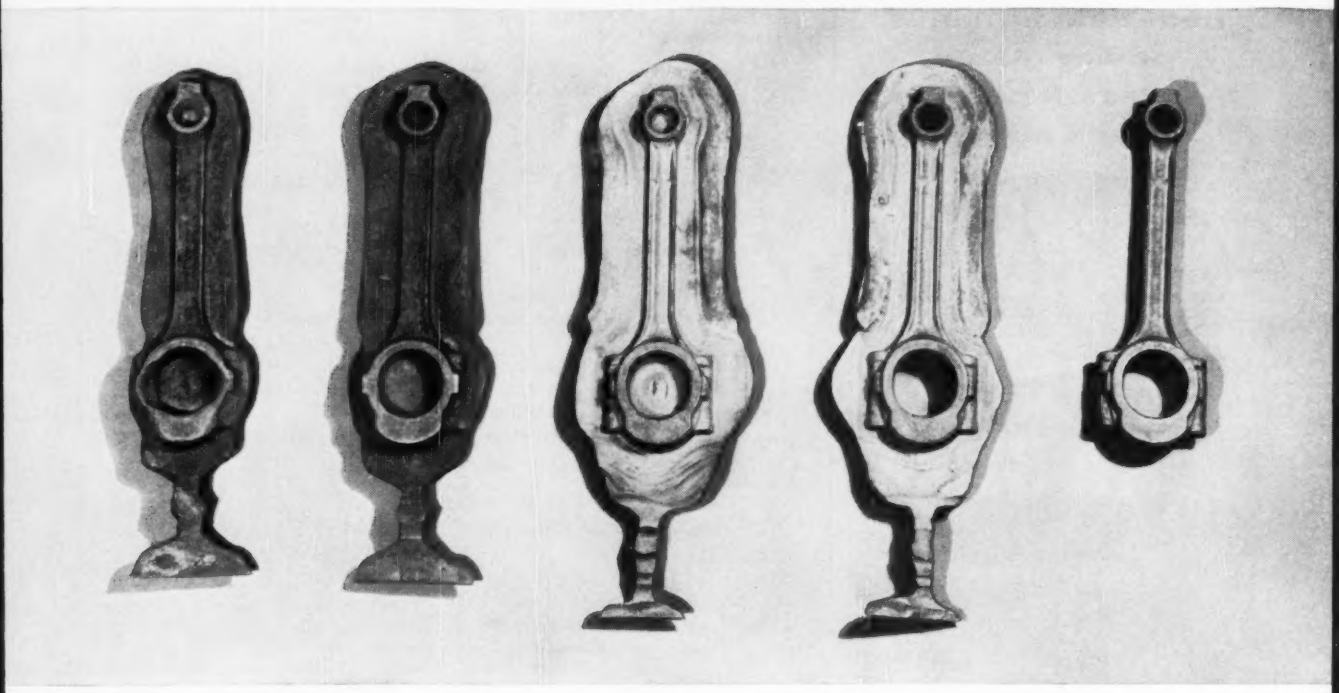
FABRICATING TITANIUM PUMP COMPONENTS: In one of their newest pump models (designed to handle ferric chloride at temperatures of 212°F.), the Mission Manufacturing Company, Houston, Texas, uses Republic Titanium for the casing and impeller. Fabricating operations—shaping, welding in an inert gas atmosphere, and machining—are performed with little change in procedure as compared with other materials. Write for information on Republic Titanium.



MEETING DESIGN REQUIREMENTS: Republic Steel Wire has the necessary strength, ductility, and toughness for difficult forming operations. Republic produces many types for virtually any application: Manufacturer's Coarse Wires; Spring Wires (Standard High Carbon and MB High Carbon); Screw, Rivet, and Heading Wires. Mail coupon for details.

CUTTING GRADER BLADE COSTS: Shunk Manufacturing Company, Bucyrus, Ohio, uses Republic High Carbon Hot Rolled Special Section Bars for their grader blades. Formed to the predominating blade cross section, these special sections eliminate most machining and forming operations. Republic Special Section Bars are available in a wide range of sizes and contours. Write for information.

FORGING CONNECTING RODS: Herbrand Division of the Bingham-Herbrand Corporation, Fremont, Ohio, realizes substantial economies through the use of Republic A-8637 Hot Rolled Alloy Steel. Non-varying uniformity permits faster production with fewer rejects. They start with 2⅛″ bars which ultimately undergo 11 forging operations, followed by heat treatment which produces the mechanical properties designed into the forging. Send for details on Republic Alloy Steels.



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A Penton Publication

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July 11, 1961

Mr. Stevens Rice
University Microfilms, Inc.
313 North First Street
Ann Arbor, Michigan.

Dear Sir.

In reply to your letter of July 6, 1961, our production department has informed the writer that a four page insert was pulled from the issue of STEEL, dated July 18, 1960 prior to the press run.

This accounts for the jump in the page numbers from 16 to 21,as noted in your letter. We trust we have not delayed you in completing the work on this issue.

Sincerely yours.

Esther Marsh.

STEEL Circulation Dept.
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Steel is low in cost. You can keep it that way if you don't tack on unnecessary expense. After you've figured initial price don't overlook what it costs to own, store, handle and cut steel for your use. These costs of possession often are hidden. But your steel service center frequently can help you reduce them.

Each steel user's case is different. Ask your steel service center to help you determine the most economical way to buy steel. They will help you figure all your costs of possession, such as:

Cost of capital	Cost of operation	Other costs
Inventory	Space	Obsolescence
Space	Material handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

Call your nearby steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

STEEL SERVICE CENTER INSTITUTE

. . . YOUR STEEL SERVICE CENTER

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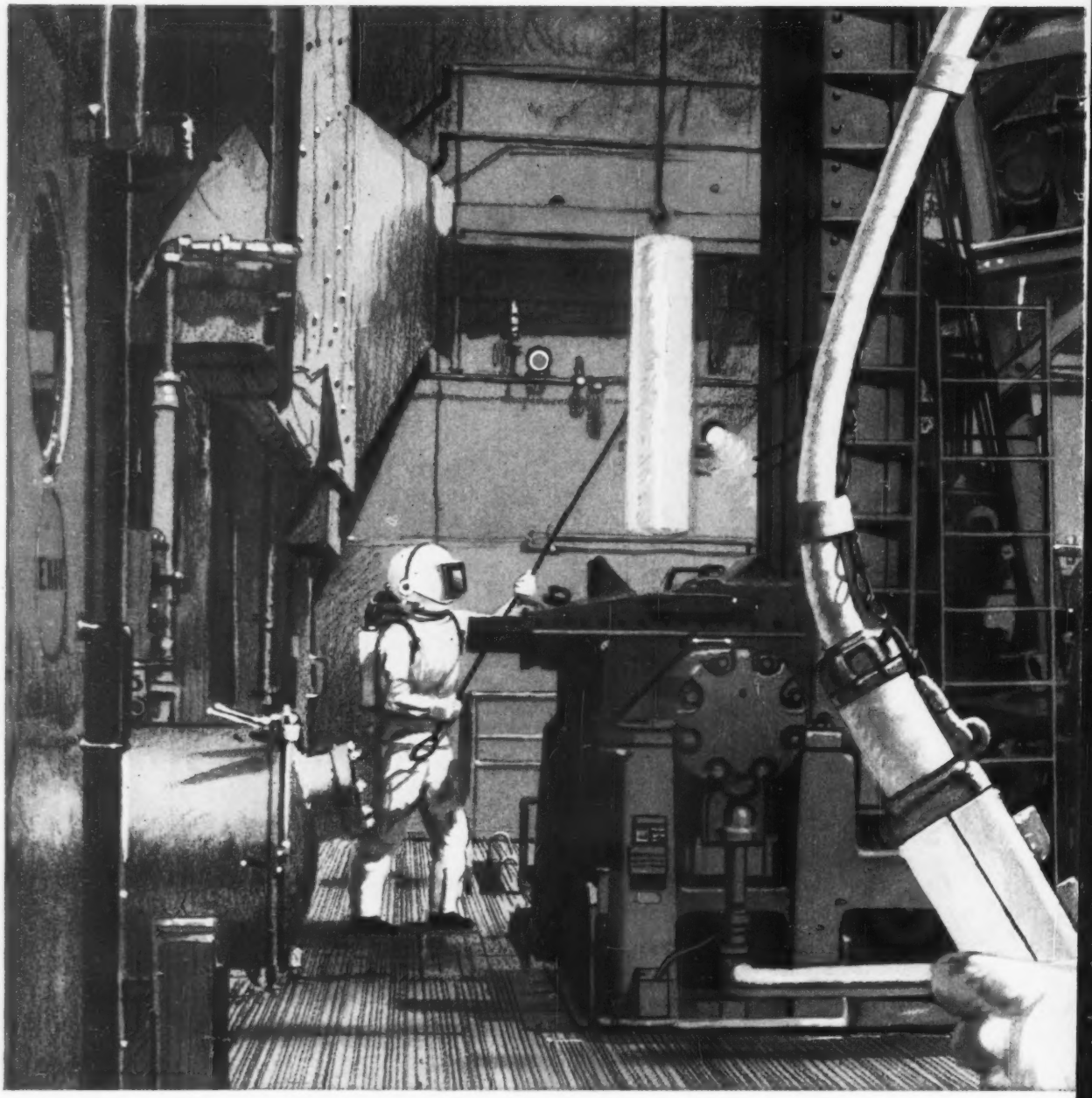

The exotic world of space

Imagine a plant without air . . . where workers must operate in space suits . . . surrounded by an atmosphere of pure argon gas. These are the conditions at Universal-Cyclops Steel Corporation's In Fab project at Bridgeville, Pennsylvania.

This unique plant was developed because exotic space age metals such as tantalum, molybdenum, columbium, should be forged and hot processed in an oxygen-free atmosphere . . . *a world of their own.* Otherwise they may react violently or break down. Yet, because these refractory metals can retain strength far above temperatures that would destroy most materials, they are vitally needed for nose cones, re-entry vehicles, jet and rocket engines.

As a result, Universal-Cyclops—in conjunction with the Department of the Navy—built a hermetically sealed plant where rolling mill, impactor, induction furnace and

age metals...*where Mobil is right at home!*

all equipment are surrounded by inert argon gas. Even a tiny flaw in these metal products might cost a man's life in space. Here the standard of quality is perfection.

That's why you'll find the equipment here protected by *Mobil*. Mobil lubricants and Mobil men have always been right at home at the frontier of progress. America's leading industries rely on the leader in lubrication. Why accept less for your plant?

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15 years engineering and millions of dollars invested* to perfect the world's finest brake... today's PACIFIC HYDRAULIC PRESS BRAKE

Over 9 out of every 10 hydraulic press brakes in operation today are PACIFIC providing...

- More dependability
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- More accuracy in level control
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- More operating convenience
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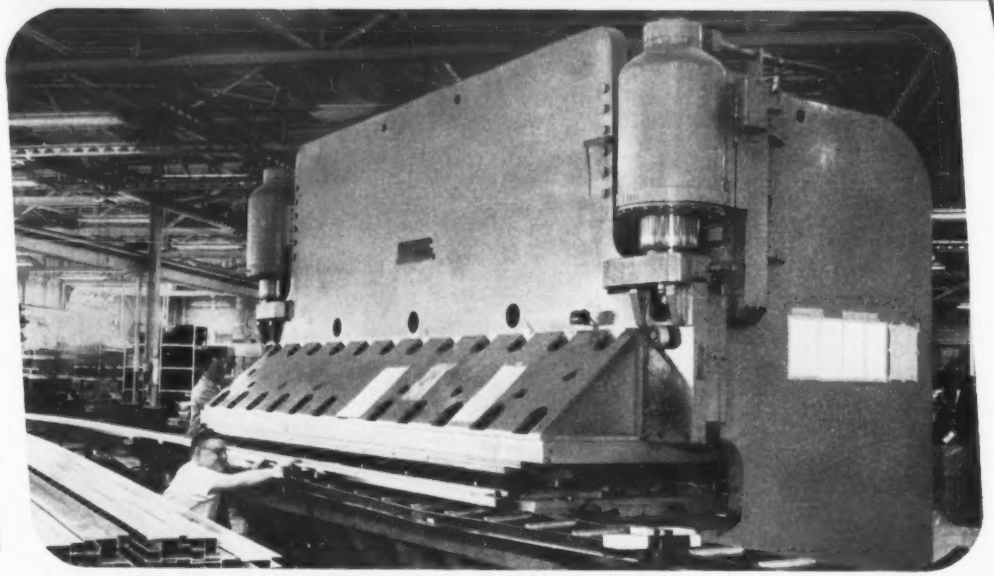

672 HOLES PUNCHED IN A SINGLE HIT! Unique upper ram guides and extra rigidity of platens of PACIFIC hydraulic press brake enable the punching of 672 holes in a single hit over a 45" wide by 14 ft. long side panel at Brown Trailer Division, Michigan City, Indiana. This rigidity permits 40 ft. long rub rails to be punched progressively with 70 holes on 2" centers over 12 ft. length on the front of the die as shown in the above photo. Cushioned hydraulic breakthrough softens the punching action on the dies to greatly increase individual punch life and eliminate costly downtime from periodic die replacement of 672 separate dies.

*THIS INVESTMENT ENABLED PACIFIC TO INTRODUCE:

- Tape control to synchronize cylinders within .003" (1947)
- Cushioned punching (1949)
- Precision depth control to repeat accuracy within .001" (1951)
- Manual turret stroke controls for progressive bending (1952)
- Selective anti-whip speeds to eliminate reverse bends (1952)
- Tandem operation of press brakes for forming pieces 40 ft. or longer (1953)
- Tonnage control to protect light dies in heavy press (1953)
- Multiple hydraulic cushion cylinders for deep drawing (1954)
- Overhead integral power unit for increased accuracy (1955)
- Cylinder ram guides for increased rigidity (1956)
- Shearing attachment for shearing heavy plate on press brake (1958)
- Pipeless stacking of valves to eliminate pipe breakage and leakage (1959)
- Shockless hydraulic valving to eliminate cause of leakage (1959)

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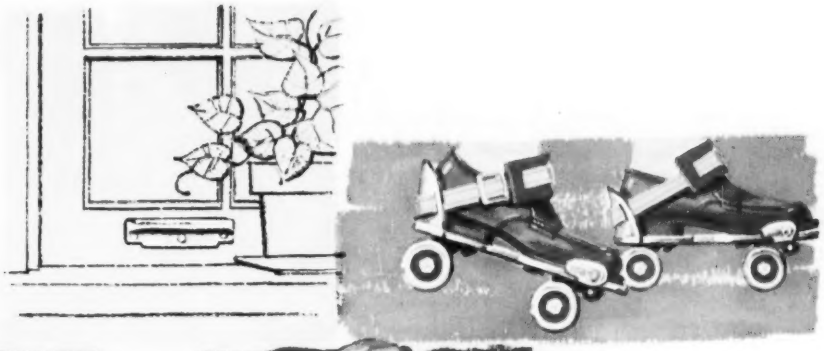
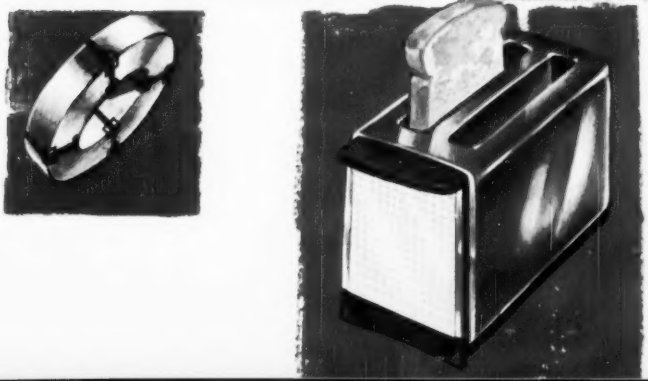
Quality products call for quality wire, bars and strip . . .



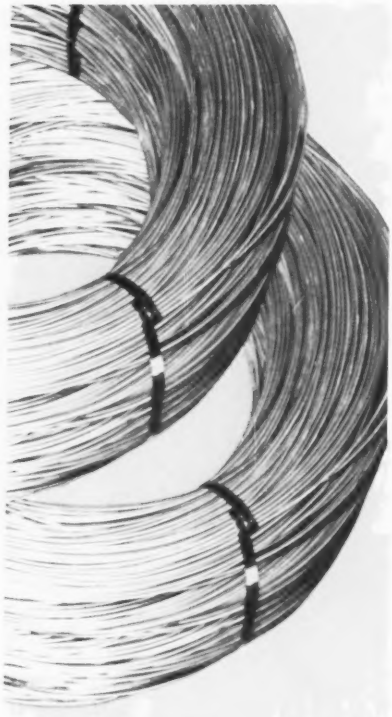


USS

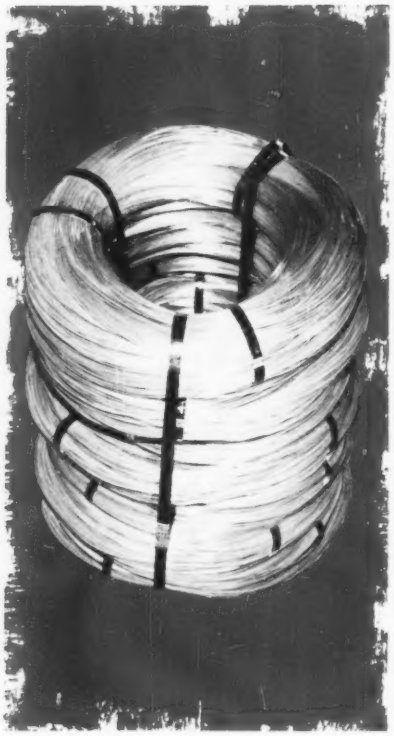
American Steel & Wire
Division of
United States Steel

USS American Quality Manufacturers Products packaged to speed up handling and save storage space

Standard Coils: American Steel & Wire manufactures standard coils in weights suited to your material handling equipment.



Heavyweight Coils: These continuous wire coils, weighing up to 2,000 pounds, speed up your production by reducing down time for setups and changes. One large coil takes the place of several smaller coils of same total weight—are much easier to handle . . . require much less storage space.



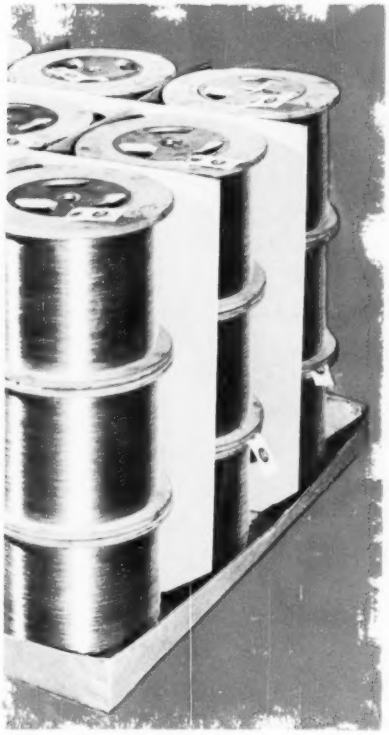
Unitized Coils: These unit packs offer great savings in handling time and storage space. One unit, containing several coils, is easily handled; takes up less storage space than the same coils stored separately.

. . . quality controlled to help you make good products better

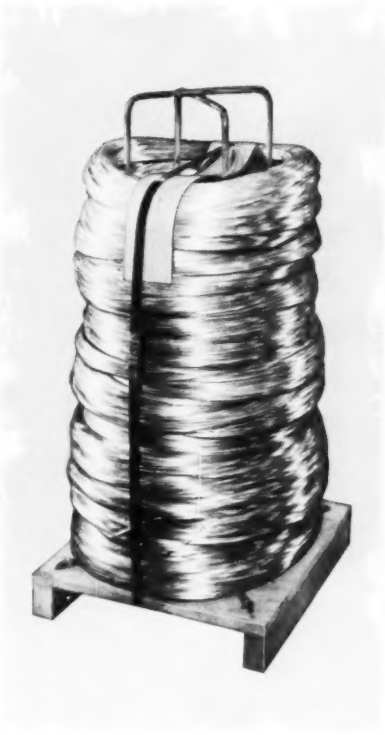
To mass produce this bicycle padlock the Master Lock Company uses USS Amer-Led Steel Bars. This leaded steel permits increased machining speed over equivalent non-leaded grades. The use of USS Amer-Led results in more accurate forming; . . . fewer rejects.

American Steel & Wire products and service facilities are available to you at no increase in cost. It will pay you to use these advantages. The quality and uniformity of USS American Manufacturers Wire brings you production economies through easier processing and fewer rejects. It makes a superior finished product that is more salable. And it is available in all the modern money-saving forms:

Pay-off Drums: Long-run continuous coils of wire are packed and delivered in heavy fibre containers. These Pay-off Drums are easy to handle and stack for storage. These are ideal for use where wire finish requires special protection from dirt and corrosive atmospheres. Available in most wire sizes with length and weight of coil to your specifications. You do not need to return drums.



Disposable Spools: These new non-returnable spools can be supplied with any amount of fine wire—from 5 lbs. to 100 lbs. These are easy to handle individually, and when shipped in quantity are delivered 36 to a pallet, ready for storage.



Platform Coil Carrier: The disposable platform carrier, made up of a U-shaped wire frame fastened to a platform, holds up to 3,000 pounds of special wire in one continuous length. It is often ideal for ordering and handling quantities of wire.

American Screw Company turns out 14 million recessed head fasteners a day. Their most famous patent is the Phillips Head Screw, for which American Steel & Wire developed a special cold heading wire, hard enough to produce strong, tough fasteners, yet soft enough to avoid splits and cracks when the Phillips punch is rammed into the coning blank.

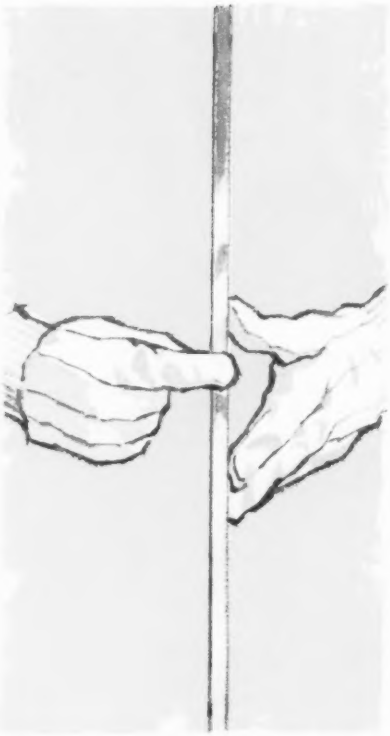
The pair of round wire helical single coil torsion springs on this chair were specially made for the Homecrest Company of Wadena, Minnesota. Under a 250-pound weight, the chair was test rocked 750,000 times without showing any sign of failure. *Another success story for USS American Manufacturers Products.*

American Steel & Wire
Division of
United States Steel

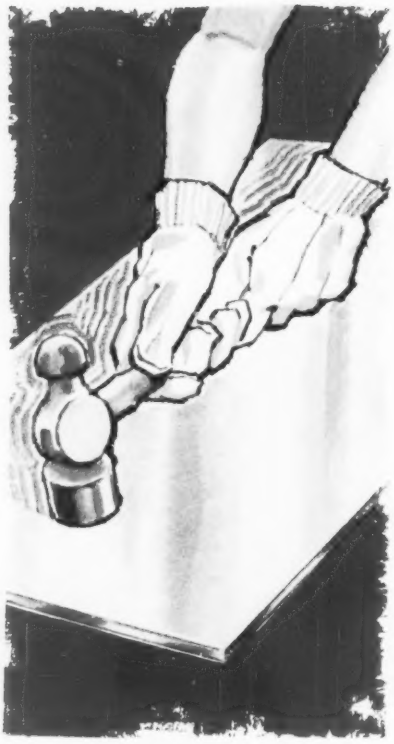
USS

USS Amerstrip . . . gives you precisely what you need in a cold rolled strip

Precision Finish. With USS Amerstrip we take special pains to give you a finish that is just right for the specific results you require in a finished product. We believe the Amerstrip finish is the finest you can get in the industry.

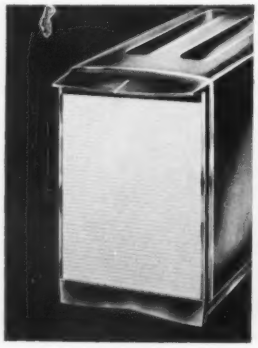


Precisely Prepared Edges. Because USS Amerstrip is produced in order-sized quantities engineered to your own specifications, we can give you exactly the edge finish you need—square, standard, round, full round or bevel.



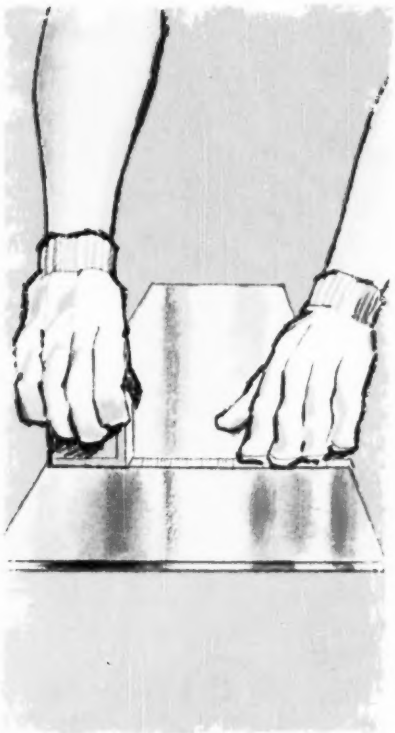
Precise Tempers. Whether your product must go through a deep draw or undergo other stringent forming operations, or if it requires a special temper for rigidity, you'll get the correct temper for the job when you order USS Amerstrip.

. . . to speed up production and keep your product quality high!



Much of the sales-pulling beauty of Proctor Electric Company's modern toaster is due to the use of gold-finished, geometric-patterned USS Embossed Amerstrip. American Steel & Wire specializes in the rolling of special embossed designs such as this for specific applications. Perhaps you, too, have a product which could be made more beautiful and more sales appealing with Embossed Amerstrip.

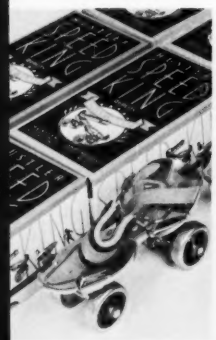
USS Amerstrip is a specialty product that has opened vast new production and sales possibilities for a growing number of alert manufacturers of consumer products. It is available in a variety of attractive finishes—plain or embossed. It permits production on precision machines. When you use USS Amerstrip, you get six distinct advantages not easily obtainable with other manufacturing methods or materials:



Precise Width Tolerances. When your fabricating machines require a special width strip, you can be sure that's the width you'll get. We can produce USS Amerstrip within required tolerance limits to fit your special requirements.

Precise Thickness Tolerances. Whatever the thickness tolerance your machines demand, USS Amerstrip can give it to you. We can roll Amerstrip down to thickness tolerances of plus or minus .0005 inches.

Precise Uniformity. Regardless of the size of your order every coil of USS Amerstrip comes off the line uniform in finish, temper, width and thickness. In short, USS Amerstrip's precision production assures a continuous run and high yield.



Amerstrip is used in the manufacture of almost every part of the 15 types of Hustler Corporation skates made by Frantz Manufacturing Co. These skates will stand up under the punishing wear children may give them—yet maintain their attractive finish. Amerstrip is tailored to each particular job . . . has the physical properties to assure a good performance and efficient manufacture.

Amerock Corporation of Rockford, Illinois, makers of sash lifts, had trouble finding a strip steel that would meet its severe double drawing operation requirements. They brought the problem to American Steel & Wire. Our metallurgists recommended a type of USS Amerstrip tailored to their deep drawing requirements and capable of holding a finish suitable for plating.

American Steel & Wire Division of United States Steel

USS

Facilities and service second to none!

As the country's largest manufacturer of wire and strip, we offer a *single source of supply* for all your varied manufacturers' wire and strip requirements.

Widespread *modern facilities* assure that your product will be made exactly to specification, thoroughly uniform in quality and dimension.

Experienced sales representatives are at your service to assist in determining how USS American Manufacturers Products can help make *your* product better.

For more detailed information, get in touch with the nearest district office. American Steel & Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio.

USS, American and Amerstrip are registered trademarks

American Steel & Wire
Division of
United States Steel

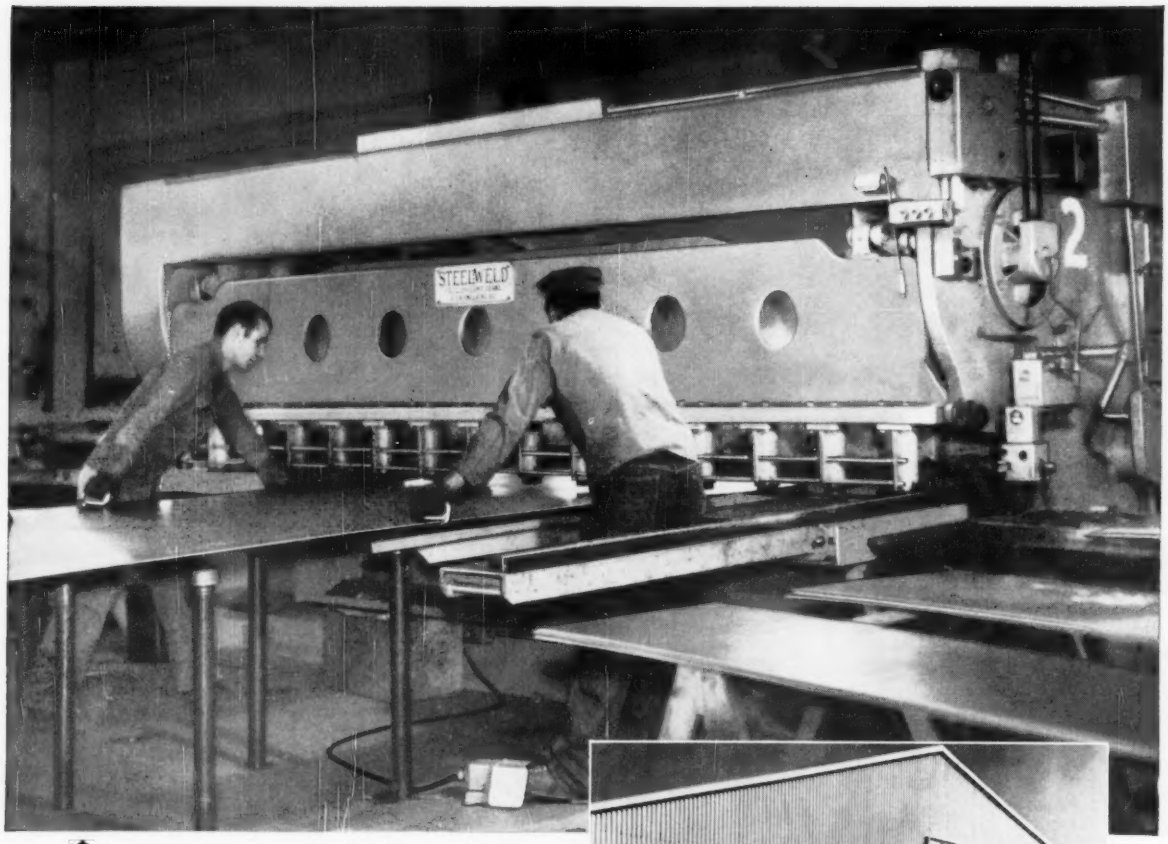
Steel

This mark tells you a product is made of modern, dependable Steel.

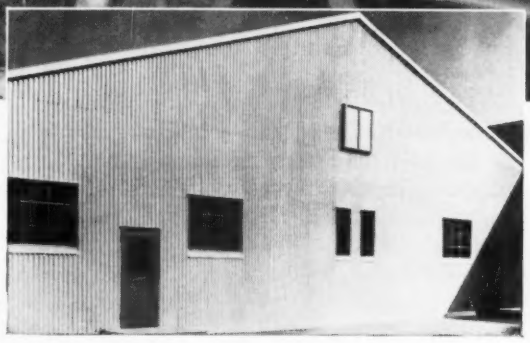
STEELWELD SHEAR

Operates 16 Hours a Day

Cuts Components for Prefabricated Buildings



Cutting and slitting operations normally keep this Steelweld Shear busy 16 hours a day. It is equipped with Steelweld's popular Micro-Set Knife Adjustment. This permits adjusting the knife clearance to suit the thickness of metal being cut in the matter of seconds. Thus, the finest cuts are assured for every shearing job.



A recent Pascoe Building.

RAPIDLY forging ahead in the prefabricated steel building field, Pascoe Steel Corporation, Pomona, California, has found its Steelweld Shear to be an extremely important factor in maintaining a steady rate of production. A large amount of shearing is required to fabricate several hundred tons of steel per month.

The Shear is normally operated 16 hours a day. It is used for cutting web plates for building columns, rafters and many other building components. About 20 hours a week it is used for slitting. The machine has functioned with very little maintenance. In nearly three years of service, the clutch has never required adjustment.

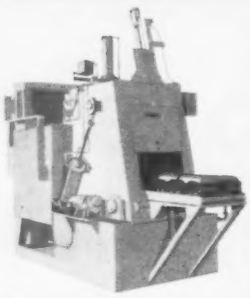
Write for free copy of catalog No. 2011

STEELWELD SHEARS PIVOTED BLADE

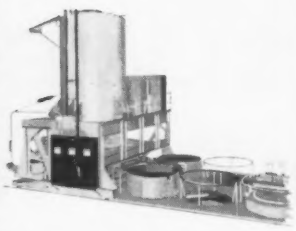
Steelweld Machinery includes: Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

THE CLEVELAND CRANE & ENGINEERING COMPANY · 7859 EAST 282nd STREET · WICKLIFFE, OHIO

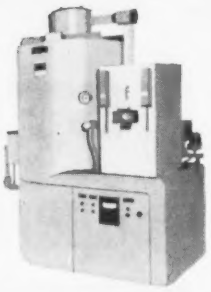
Laboratory Equipment: One-unit box furnace (shown), muffle or for non-oxidizing atmosphere with temperature range to 3000° F.



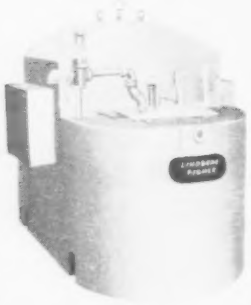
Automatic Carbonitriding Furnaces: Automated integral quench type (shown) with CORRTHERM electric elements.



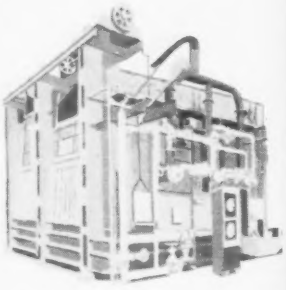
Gantry Type Furnaces: Vertical, controlled-atmosphere, drop bottom, hardening furnace (shown). Complete installation field-installed by Lindberg.



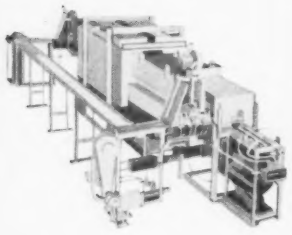
Atmosphere Generators: Hyen generator (shown) for endothermic atmospheres. Generators for all required atmospheres.



Melting and Holding Furnaces: Electric resistance furnace (shown) with capacities of 750 lbs. to 1500 lbs.



Aluminum Reverberatory Furnaces: Twin-chamber melting and holding furnace (shown) with 45,000 lbs. capacity.



Ceramic Kilns: Fully automatic, atmosphere controlled kiln (shown) has 5 control zones for flexibility. Maximum temperature, 2700° F.

Cyclone Tempering Furnaces: Batch type fuel fired tempering furnace (shown). Famous in metal treating industry for years.

When a product needs heat let Lindberg apply it

Applying heat to industry has been our only vocation for many years. When your product needs heat it makes sense to consult the most widely experienced experts you can find. We believe we have them here at Lindberg. First of all, we manufacture a full line of equipment, the most complete in the field; heat treating furnaces, salt bath furnaces, melting furnaces, induction heating units, ceramic kilns, laboratory and pilot plant furnaces—electric or fuel fired, built in our plant or field installed. So, we can recommend just the correct techniques best suited to your individual requirements and your production methods. Here at Lindberg we have an exceptionally creative group of metallurgists, research technicians and engineers, the best in the business, we vow. You can count on them to answer your industrial heating problems satisfactorily, no matter how complex or unusual. Our world-wide organization, with plants and subsidiary companies in many countries, makes this superior service available to you anywhere.

LINDBERG ENGINEERING COMPANY

2441 West Hubbard Street, Chicago 12, Illinois

Los Angeles Plant: 11937 South Regentview Avenue, at Downey, California

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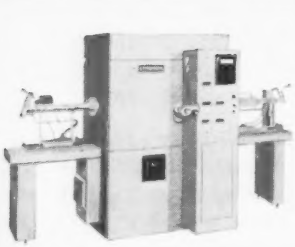
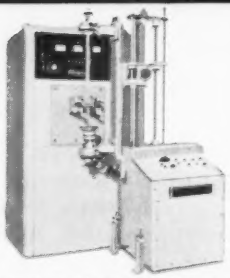
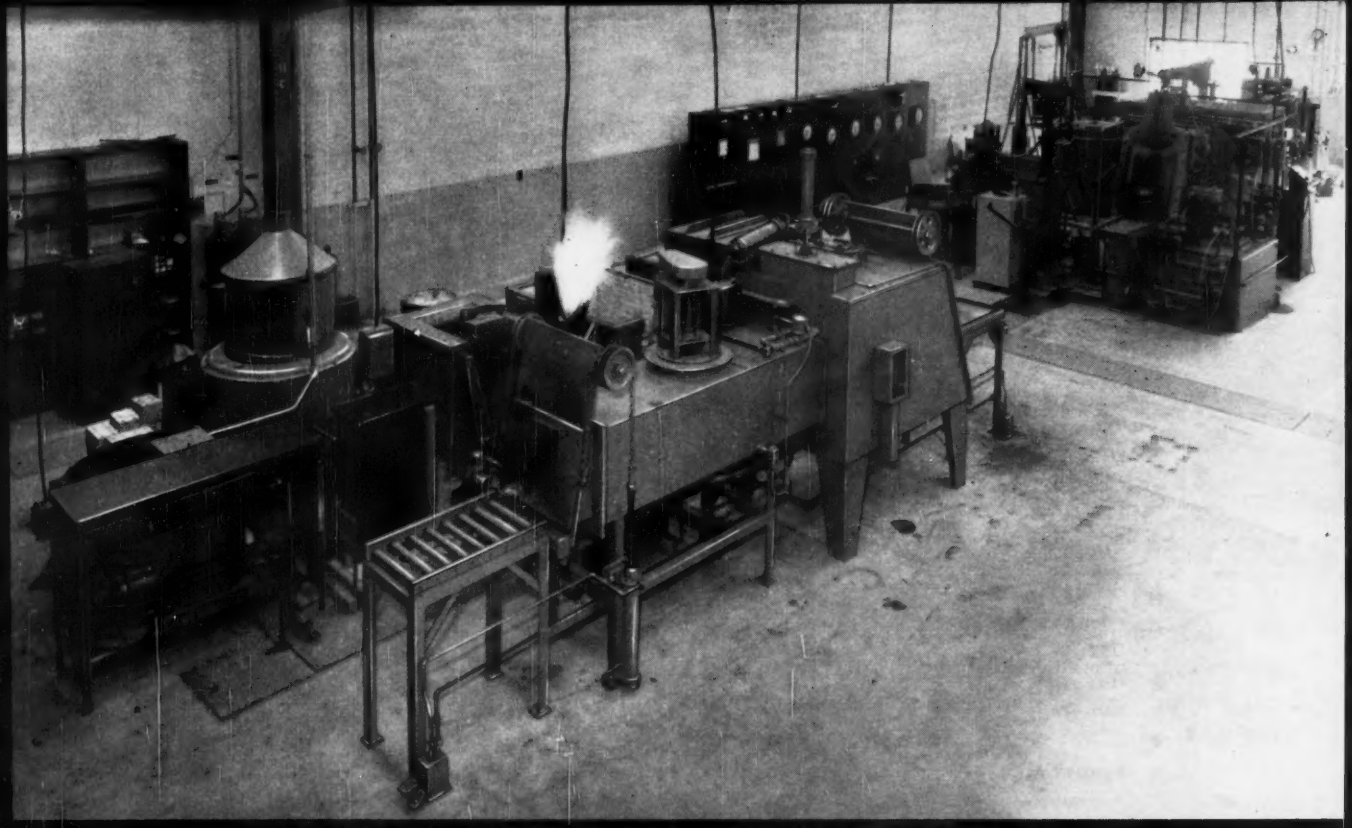
LINDBERG **heat for industry**



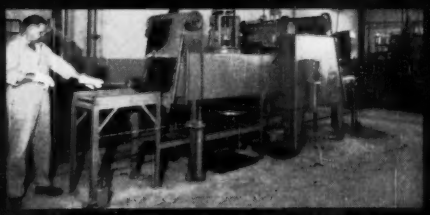
High Temperature Furnaces: New Graphite Tube Furnace (shown) with temperature range 2600° F. to 5000° F. for research and production in metal and ceramic fields.



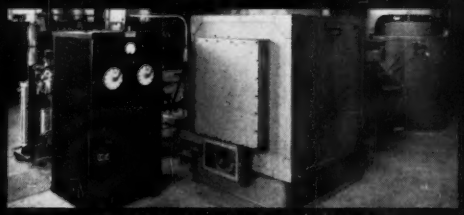
Induction Heating Units: New Lindberg Floating Zone Scanner for precise production of hyperpure semi-conductor materials and metals and Induction Heating Unit (shown).



General view of complete Heat Treating Department at new plant of Lear, Inc., Grand Rapids, Michigan. All equipment including furnaces, Hyen atmosphere generator, control panels, oil quench is by Lindberg.

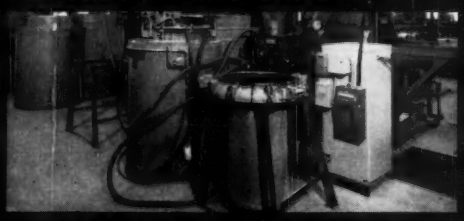


Electric atmosphere brazing and annealing furnace. Hand pusher type . . . 2100° F. maximum temperature.



Electric pit furnace for treatment of high temperature alloys in dry hydrogen atmosphere. Tap transformer also shown.

The retort for high temperature pit furnace for treatment of alloys at 2200° F. (left). Production tempering furnace, 22" x 26" work space, shown at right.

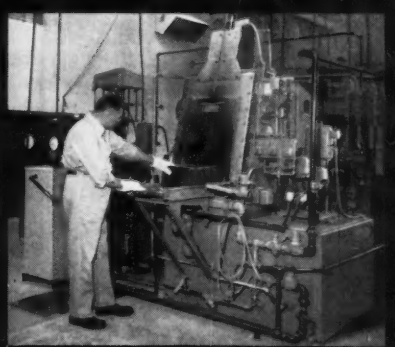


Atmosphere tempering furnace, 16" x 24" work space, for both gaseous nitriding and steam treating. One retort in foreground.

LINDBERG Equips Complete Heat Treating Department at Lear, Inc.

The heat treating requirements for the new Grand Rapids plant of Lear, Inc., were put into Lindberg's hands. We supplied them in the way the photographs show. Our engineers cooperated fully with Lear in the selection of the proper Lindberg equipment and the layout of the complete heat treating department. This installation illustrates one of the big advantages of consulting with Lindberg. Our years of experience in all phases of the application of heat to industry, our complete line of all types of industrial heating equipment offer the best assurance that you can coordinate all your needs in one reliable, experienced source. Consult your local Lindberg Field Representative (see classified phone book) or write us direct.

LINDBERG **heat for industry**

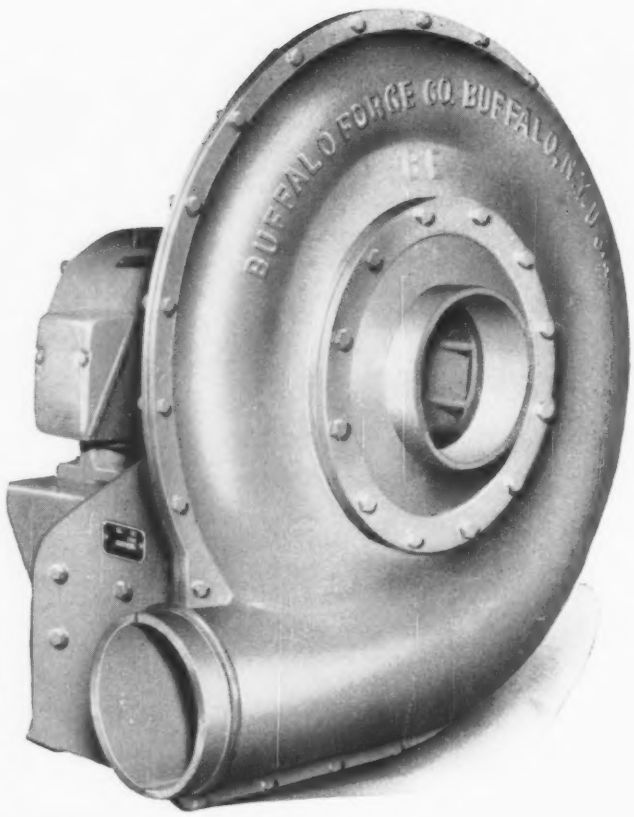


Integral quench furnace with CORRTHERM electric heating elements . . . for carbonitriding and general heat treating.

Do you need pressurized air for jobs like these?

- Oil or Gas Furnace Blowing
- Cupola Blowing
- Gas Line Boosting
- Exhausting from Grinding Wheels

then this is what you need!



"BUFFALO" TYPE "E" BLOWERS AND EXHAUSTERS

Wherever you need constant air pressures up to 5500 cfm, these dependable "Buffalo" Blowers will do the job most efficiently and economically. Compact, ruggedly-built, direct-connected "Buffalo" Type "E" Blowers and Exhausters are available in eight sizes. Pressures up to 2 lbs. mean you can choose the units exactly suited to your needs.

Various special features are available, including flanged inlet, flanged outlet, stuffing box around the shaft for gas-tightness. For corrosive fume handling, housings can be coated with Bisonite or Heresite. Housings may also be cast of special metals. Stainless steel, Everdur, brass or aluminum wheels are available. Used in multiple, these units are more flexible and economical than a single large blower.

For full information on "Buffalo" Type "E" Blowers and Exhausters, contact your "Buffalo" engineering representative—or write us for Bulletin FMB-935. Other units suitable for higher pressures are the type RE and type CB blowers.

"Buffalo"

BUFFALO FORGE COMPANY

Buffalo, New York

Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

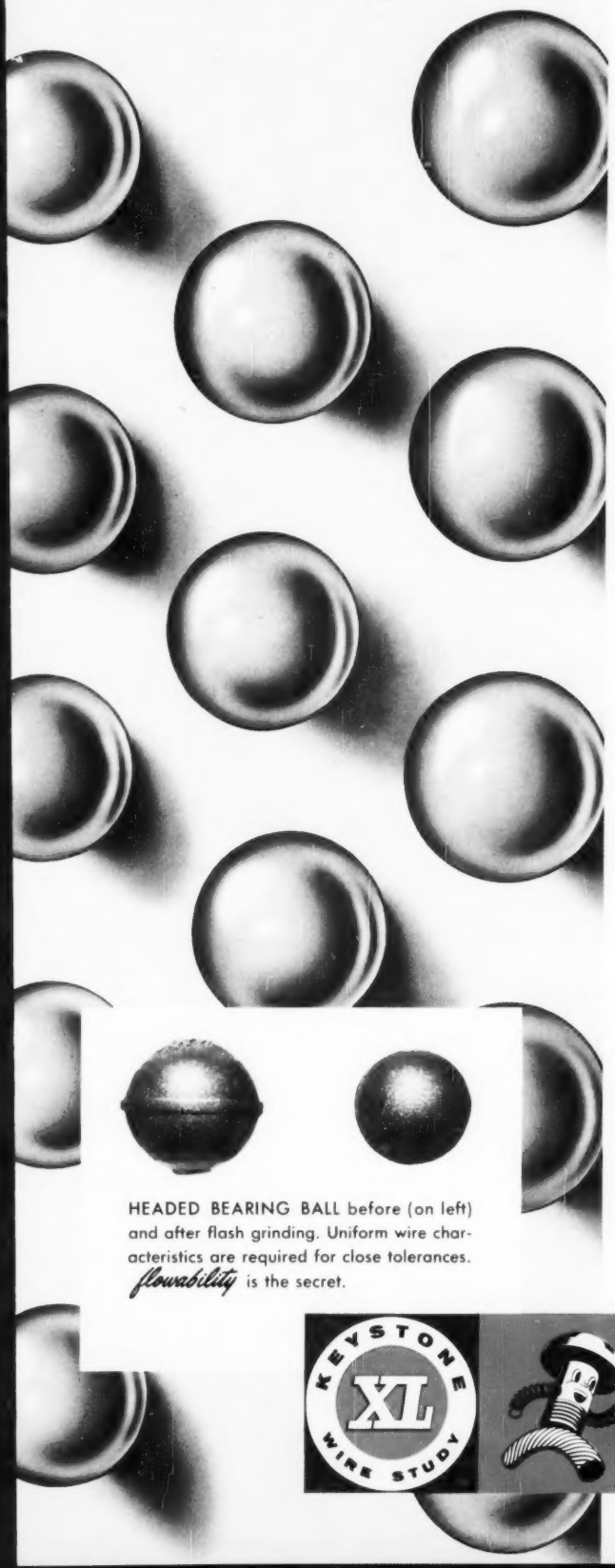
Squier machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

PIONEER

STEEL BALL COMPANY, INC.

MILL STREET, UNIONVILLE, CONNECTICUT, U.S.A.

ALL THAT THE NAME IMPLIES



HEADED BEARING BALL before (on left) and after flash grinding. Uniform wire characteristics are required for close tolerances. *flowability* is the secret.

KEYSTONE WIRE

rewards ball manufacturer

Rolling from the heading dies of Pioneer Steel Ball Company, Inc. of Unionville, Connecticut, come steel bearing balls made from wire for uses ranging from missiles to roller skates, to bag fasteners, to balls for burnishing.

Pioneer bearing balls must conform to approved engineering standards with sphericity often specified as close as .00001". To get maximum quality, Pioneer makes a point of knowing their basic material—wire!

President N. Martinelli says, "This combination of right chemical analysis with special drawing and thermal treatment results in proper end quality. You can't have one without the other. That's why we like Keystone "XL" Ball Bearing Wire. It has consistent *flowability* and hardenability properties."

Keystone "XL" Ball Quality Wire conforms repeatedly to analysis of interior hardening properties and exterior workability for upset actions. Care in drawing the wire assures consistent characteristics—uniform size, extremely fine grain structure, *flowability* that results in long die life and high quality bearing balls.

Perhaps your wire problem can be solved the Keystone way. Phone or write today for consultation with a Keystone representative regarding application of "XL" Heading Wire to your product.

Keystone Steel & Wire Company, Peoria 7, Illinois

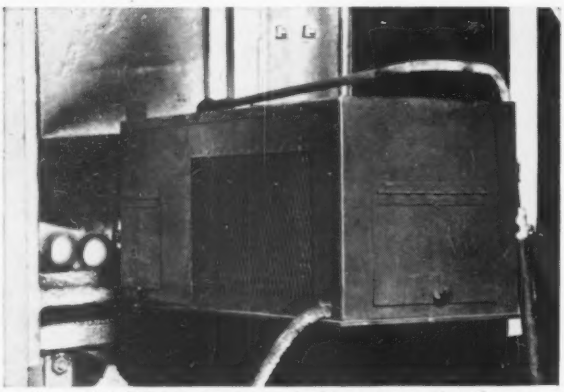
KEYSTONE XL WIRE STUDY

KEYSTONE

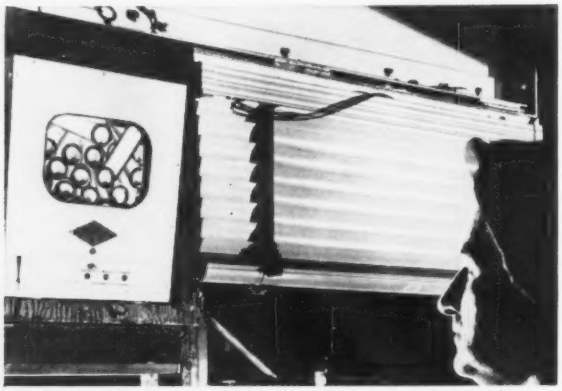
WIRE FOR INDUSTRY

How Diamond TV cuts costs for Timken Company

"Utiliscope"® *pays for itself in just eight months*

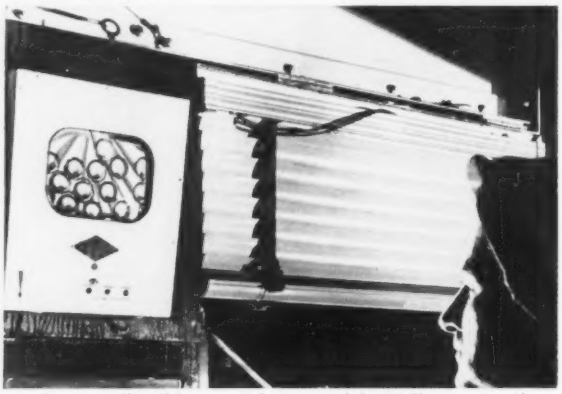


1 Air-cooled TV camera peers inside tube-cooling furnace, transmitting continuous picture to dispatcher in control pulpit 100 feet away. Dispatcher checks television monitor image which shows progress of tubes on walking beam conveyor — watches for pile up of tubes at conveyor exit.



2 Dispatcher, monitoring TV screen, spots a tube pile up instantly. Time lag in old method . . . hand signals from man at furnace port . . . could not have prevented piled tubes from gouging furnace refractory lining before conveyor could be stopped. Costly damage is eliminated . . . production efficiency improved!

3 With piled tubes realigned, cooling production continues with conveyor speed adjusted to prevent recurrence. Dispatcher now flips to second "Utiliscope" on adjacent annealing oven — the next step in tube production where tubes are piled cord-wood style.



4 In annealing furnace, tubes are picked off one at a time at back of furnace by powered rollers under dispatcher's control. Here, dispatcher watches for bridging of tubes which can prevent movement onto delivery conveyor. All clear here, again no spotter is required, again production flow is smoothed and protected with extreme accuracy.

In summary, one dispatcher at Timken's Canton, Ohio, Steel Mill now controls with greater overall efficiency: (1) tube mill, (2) tube cooling furnace, (3) annealing oven. Ambients at the camera location are above 125°F. Tube making is a hot process. It is in this hot spot that signalmen, formerly required, had to work. The signalmen are now working on more skilled jobs in relatively cool work areas.

Diamond's "Utiliscope" provides the metals industry the opportunity to eliminate non-productive tasks, centralize production control, reduce waste, increase employee morale, and gain new operating safety.

Our trained application engineers know the problems of providing effective trouble-free service in hot, tough, dusty locations. They are available to you as assistants in your analysis of the application of television to your open hearth, oxygen process, slab reheat, melting tables, strip mills, shears, raw materials, handling, pouring . . . or any of the other more than thirty known applications.

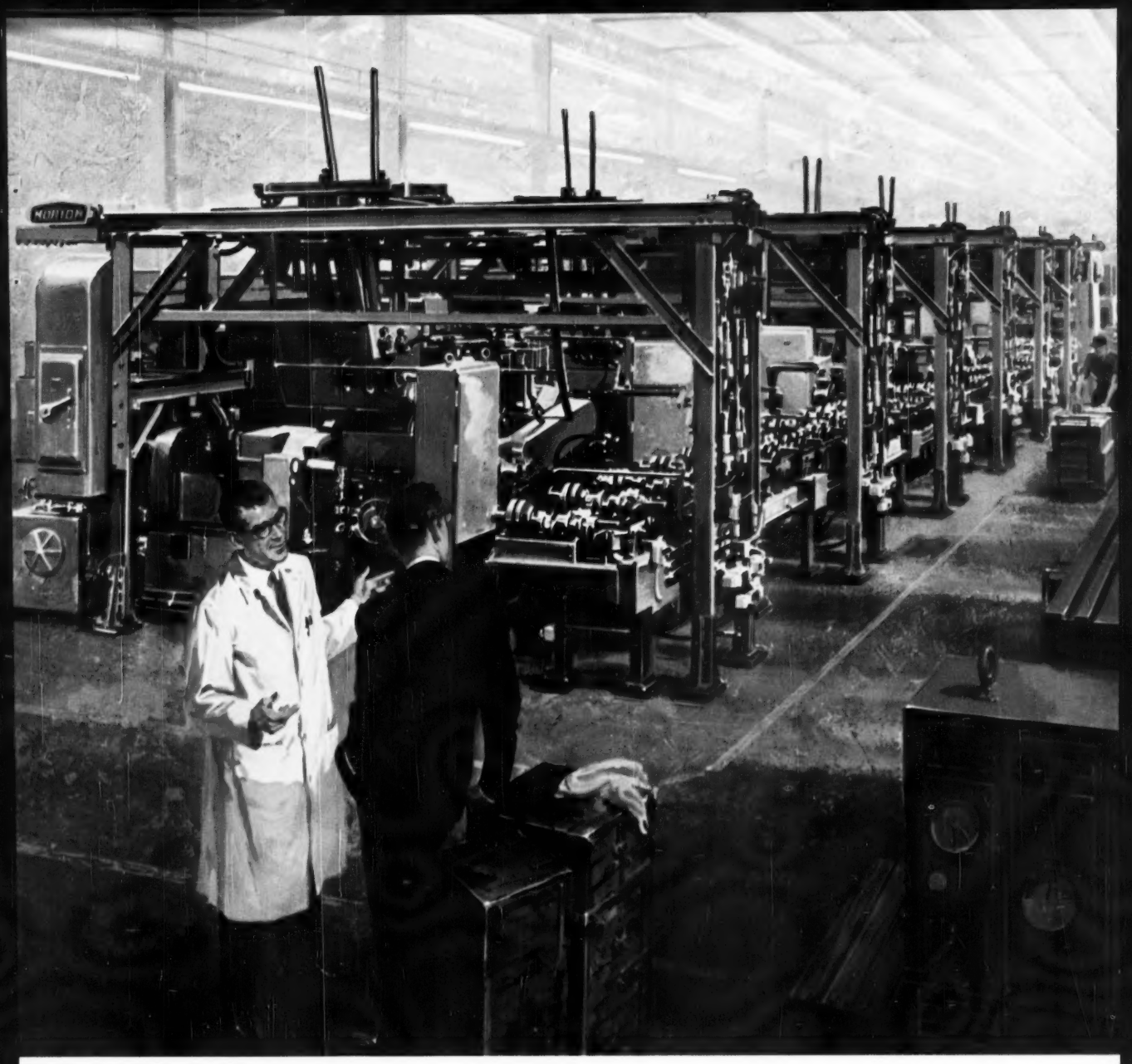
Why not request Field Survey FS33A today? Phone Lancaster, Ohio, OLive 3-6540 or TWX 490.

HELP WANTED . . . *Challenging opportunities available at Diamond Electronics for physicists, electronic and mechanical engineers. Contact C. H. Thomas, Technical Personnel.*

Diamond® Electronics

DIVISION OF DIAMOND POWER SPECIALTY CORPORATION

LANCASTER, OHIO



And now . . .
Norton Automatic Transfer Machines Multiply the "Touch of Gold"

The new Norton Transfer Type Crankshaft Grinder is actually many cylindrical grinders in one . . . in which adjusting, controlling, gaging, transferring and all other manual operations have become fully automatic! Once again the Norton "Touch of Gold" aids in mass-producing . . . swiftly, accurately, economically.

To the development of grinding machines — ranging from the smallest and simplest to the largest and most complicated — Norton brings the longest and broadest experience. See your Norton Man about putting this experience to work for you.

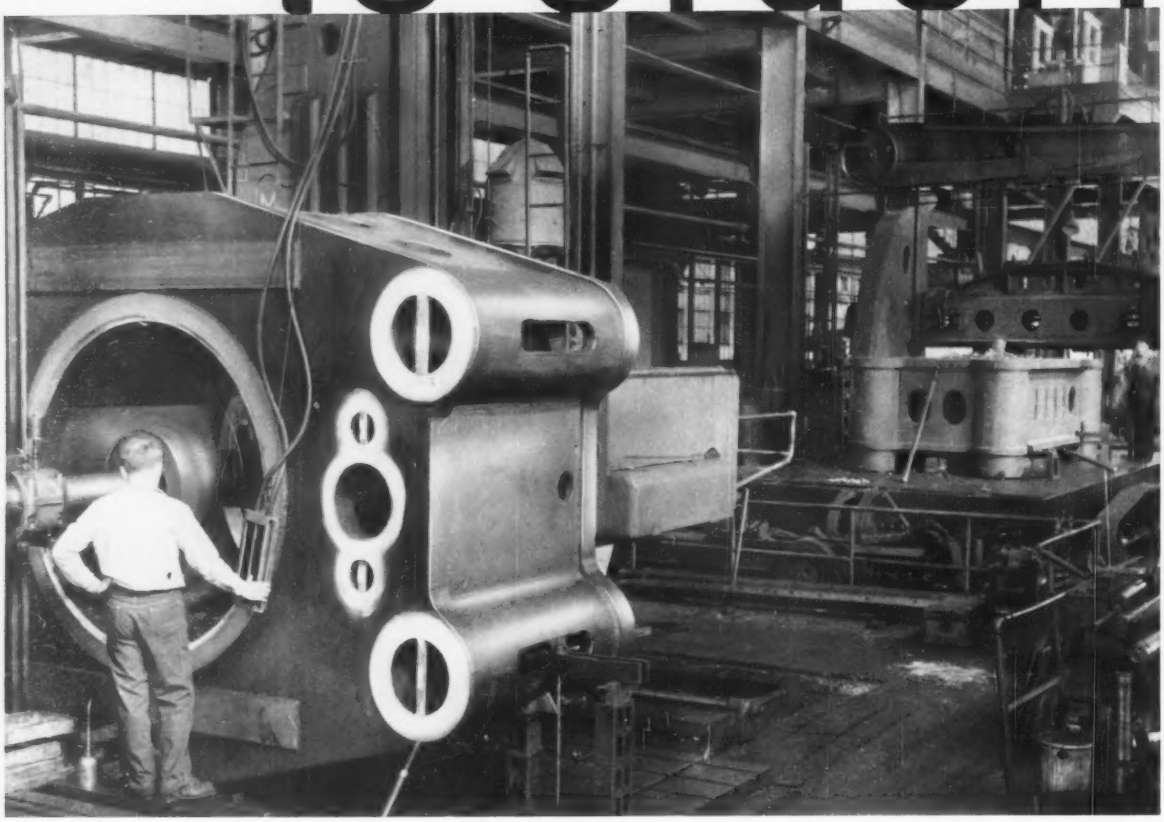
NORTON COMPANY, Machine Tool Division, Worcester 6, Mass.

NORTON
MACHINE TOOLS

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes
MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines • Gear Induction Hardeners

Build exactly what you want • • • to order!



VERSATILITY—that's the word for Sun Ship. And that's why you get the machinery or industrial equipment you need, built exactly to your requirements, when you specify Sun Ship.

Consider, for example, the machining operations shown above. To the left is a press cylinder being machined on a 72″ Draw-shaper and to the right is a large platen on a 14′ wide Planer. Here we custom-produce a wide variety of machinery or machine components to do difficult jobs in petroleum, chemicals, atomic power—in many fields.

If you would like to investigate the advantages of Sun Ship machine building service, why not contact our Sales Engineering Department now? For information and data on any phase of our service, simply write

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SHIPBUILDING & DRY DOCK COMPANY

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The reputation of Roebling high carbon flat spring steel is based on two uncompromising facts: its unexcelled dimensional and mechanical uniformity.

They are qualities that contribute immediately and directly to *your* increased production rates and decreased rejects.

You are taking advantage of a collection of benefits when you specify Roebling. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for complete information.

Roebling high carbon flat spring steel is used for a wide variety of parts.

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Roebling... Your Product is Better for it

high-pressure pumps

tailor-made

to your exact requirements

Whatever your high-pressure pumping requirements—for boiler feed, debarking, pipeline, refinery charge or cycling service—one of these I-R units is tailored to do the job dependably and *economically*. Covering the complete high-pressure range, up to 6500 psi, these pumps are designed to meet the specific operating conditions to best advantage, with efficiencies that stay high through years of continuous service.

All three of these high-pressure pumps have one thing in common—the "Unit-Type" rotor design. Shaft, impellers and interstage channel rings are assembled as a single, compact unit that can be easily removed for inspection or servicing. Maintenance is easier and there's less of it. All parts are precision machined for closer control of fits and clearances. Except for suction and discharge stages, all impellers and channel rings are interchangeable, reducing spare parts inventory. Multiple-volute passages in the channel rings assure complete radial balance at all loads, for longer bearing life and vibration-free operation.

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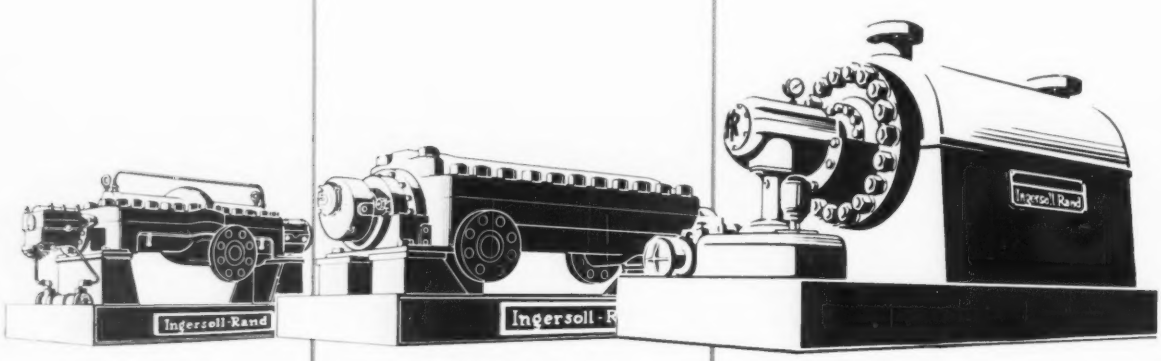
CAPACITIES to 700 gpm

INTERMEDIATE PRESSURES
CAPACITIES to 2500 gpm

PRESSURES to 6500 psi
CAPACITIES to 7200 gpm



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Class HMTA
Bulletin 7233-A

Class CHTA
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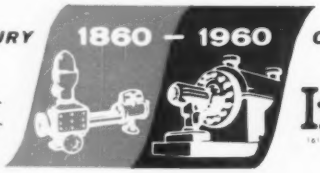
A CENTURY 1860 — 1960 OF PUMP PROGRESS



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COMPRESSORS • GAS & DIESEL ENGINES • PUMPS • AIR & ELECTRIC TOOLS • CONDENSERS • VACUUM EQUIPMENT • ROCK DRILLS

New Light Brighter than Center of Sun

Hughes Aircraft Co.'s Dr. T. H. Maiman shows a cube of synthetic ruby crystal that forms the "heart" of a laser, which generates light brighter than the sun's center, the firm claims. Possible applications: 1. Focusing of light into high intensity beams for space communication. 2. Industrial, medical, and chemical purposes. 3. Investigation of the properties of matter. Dr. Maiman said the laser beam could be sent from Los Angeles to San Francisco without spreading more than 100 ft.

Metalworking Imports Hold High in May

May imports of metalworking products totaled $333.3 million (vs. $334.3 million in April), the Commerce Department reported last week. The breakdown for major categories:

(Millions of dollars)	May	April		May	April
Iron ore & concentrates	34.7	21.5	Agricultural equipment	13.3	16.4
Copper	33.4	26.6	Autos & parts	62.7	71.9
Iron & Steel semimanufactures	15.4	23.1	Machinery	47.4	44.6
Aluminum	7.9	6.3	Vehicles, except autos	12.0	10.5
Steel mill products	27.5	28.9	Instruments	3.5	3.5

Steel Exports Rise, Imports Drop

The freighters have turned, and the U. S. is making a strong bid to become a net exporter of steel mill products this year. May exports jumped to 320,000 tons from 235,000 in April and 183,000 in May, 1959. Imports dropped to 272,000 tons in May from 331,000 in April and 385,000 in May, 1959. The May figure was the lowest since January, 1959. The big export gains came in sheets, strip, and tin mill products. The only products showing a sizable import gain were pipe and tubing.

Executive Demand Is Heavy

Look for a continuation of the shortage of executives to fill $10,000-and-above jobs in medium size companies. So predicts Executive Manpower Corp., New York. The management recruiting firm says the men toughest to find will be executives in engineering, sales, and production.

Business Barometers Mixed

Malleable iron foundries, operating at the lowest level since the steel strike, expect a turnaround in orders soon, says Malleable Founders Society . . . Radio and TV output in May climbed above the April level, says Electronic Industries Association . . . Shipments of electrical integral horsepower motors and generators in 1960 will rise 8 per cent above the 1959 level, predicts the Commerce Department . . . Net new orders for industrial heating equipment dropped sharply in May but for the first five months of this year remain 14.5

Technical Outlook—Page 85 Market Outlook—Page 123

per cent ahead of the like 1959 period, says Industrial Heating Equipment Association . . . May sales of major electric appliances dropped below the year-earlier level, reports National Electrical Manufacturers Association . . . May shipments of industrial fasteners held at the April level, reports Industrial Fasteners Institute.

Seven Sins of American Exporters

The typical U. S. firm selling in world markets is deficient in seven areas, the University of Michigan's Laurence P. Dowd told an American Marketing Association meeting. The areas: 1. Marketing research. 2. Product planning—items don't suit the needs of their potential users. 3. Advertising and sales promotion—not intensive enough abroad. 4. Credit—more extension is often necessary. 5. Currency—prices should be quoted in local currency. 6. Delivery—U. S. suppliers quote long delivery times and sometimes don't keep their promises. 7. Service—stocks of parts must be maintained abroad. Mr. Dowd says U. S. businessmen blame the wage differential for too much of their decline in exports; much of the drop is due to poor marketing.

Exports Climb Higher

U. S. exports in May climbed to $1,775 million (vs. $1,534 million in May, 1959), says the Commerce Department. May exports of metals and manufactures rose to $188 million vs. $167 million in April. Exports of machinery and vehicles rose to $677 million in May from $661 million in April.

Clerical Salaries Rising, NOMA Survey Shows

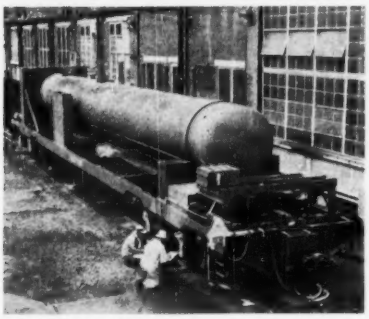
The average weekly salary for clerical employees in the U. S. is $73—up $3 from last year, the National Office Management Association learned in its latest survey (it's available for $30). Other findings: Six paid holidays is still the most popular practice, but seven and eight are gaining . . . The ratio of total workers to office workers is now 2.7 to 1 (vs. 3.1 to 1 last year) . . . There has been a slight increase in unionization.

GE and IUE Will Start Bargaining Tomorrow

General Electric Co. has agreed to begin contract talks with the IUE tomorrow (July 19)—a month earlier than provided. GE put a $500 million price tag on union contract demands over a two-year period. The IUE is asking a direct wage hike, a union shop, SUB, company payment of the full cost of insurance and pensions, and other fringes. GE called the demands "astronomic." If granted, said the company, they would lead to the loss of

thousands of jobs, destroy the firm's competitive position, and bring about a buyers' strike. The company countered with a promise of an offer that would give workers "no valid reason from their standpoint" to strike when present contracts expire Oct. 1.

Mobile Missile Site Would Keep Enemy Guessing



American Car & Foundry Div., ACF Industries Inc., Berwick, Pa., is showing off this "preprototype" rail car to transport and launch the Air Force's Minuteman. Missile trains will tour the country to keep an enemy guessing about the location of missile launching stations. ACF says it has come up with a new method of cushioning vertical, longitudinal, and transverse shocks.

Clerical Error Threatens Passage of Wage Bill

An apparent error in the minimum wage bill passed by the House could remove some 14 million workers now covered from the protection of the law. A Senate-House conference could amend the error, but that would require the co-operation of the House Rules Committee, which is a conservative group. Even if the bill is corrected and made law, organized labor won't be happy. The bill would hike the minimum wage to $1.15 and extend coverage to about 1.5 million workers. Labor wanted $1.25 and coverage for 4 million.

Commerce Reports Consumer Spending Shifts

Metalworking products claimed a larger share of the consumer's buying dollar in 1959 than in 1958, the Commerce Department reported last week. Durable goods expenditures in '59 totaled $43.4 billion—13.8 per cent of last year's record $313.8 billion outlays. The '58 mark was $37.3 billion—12.7 per cent of the total. Here are last year's dollar figures (in billions) and percentage increases from the '58 mark:

Food & tobacco	$85.2	(2.4%)	Transportation	$38.9	(15.4%)
Clothing, jewelry	33.0	(6.4%)	Recreation	18.3	(8.9%)
Housing	40.5	(6.6%)	Education & research	3.9	(8.3%)
Household operation	43.9	(6.3%)	Religious & welfare	4.3	(7.5%)

Chicago PAs See Better Second Half

The June survey of the Purchasing Agents Association of Chicago finds: Second half—61 per cent expect it to be better than the first; 8 per cent predict a decline; Prices—Marked stability is noted; Inventories—More reductions are in store; Employment—Up slightly; Production—June held at the level of the four previous months; Backlogs—Holding steady.

Tappan to Make Dishwasher

Tappan Co., Mansfield, Ohio, will add a family dishwasher to its appliance line, Truman B. Clark, Mansfield Div. manager, told STEEL in an exclusive

interview. Reason: "We have to protect and increase our sale of ranges to the large volume builder market," says Mr. Clark. Those builders like to buy a "package" of appliances. But Tappan doesn't advocate "going overboard with a complete line."

RCA Develops More Efficient Thermionic Converter

Radio Corp. of America says it has developed a simple, inexpensive thermionic conversion device (to produce electricity directly from heat). RCA says the device has converted up to 14 per cent of the heat energy derived from conventional sources, such as burning gas.

Automotive Aluminum Use to Reach 1 Million Tons by 1970?

By 1970 automakers will be consuming 1 million tons of aluminum a year—just about half the expected total primary production in the U. S. in 1960. That's the prediction of George E. Herrman, manager of transportation sales for Aluminum Co. of America. Family cars of 1970 will utilize aluminum in a myriad of new chassis, body, and engine applications, he says. By 1975 each family will require well over 500 lb of aluminum for its "Transportairs"—vehicles that will float a foot above ground and be guided by radio waves. By 1980, or slightly later, the first aluminum "Levitator," powered by an engine no larger than a coffee cup, could transport man.

Straws in the Wind

Armco Steel Corp.'s Middletown Works got a $1 million overhaul last week, involving more than 150 major repair jobs . . . The NLRB has certified the UAW as bargaining agent for production workers at Wagner Iron Works, Milwaukee . . . Studebaker '60-model retail deliveries are 3.7 per cent above the pace last year at this time . . . The American Marketing Association has launched a campaign to add 500 new company sponsors . . . The Commerce Department denied a request from secondary aluminum smelters to limit imports of aluminum scrap . . . The United Steelworkers came through the strike with a net worth of $26,440,807—about $6 million less than at the walkout's inception . . . Personnel notes: Ernest Breech has resigned as Ford Motor Co. chairman but will stay on as a director and chairman of Ford's finance committee; Henry Ford II assumes the chairmanship, as well as retaining the presidency; Gordon Patterson, former Square D Co. president, assumes that job with Yale & Towne Mfg. Co.

Metalworking Pulse

The Business Trend: STEEL's industrial production index is expected to regain its preholiday level within two weeks following the biggest Fourth of July decline in the last eight years. **Autos:** Chrysler Corp. is leading the way in model changeover shutdowns. The weekly production totals will decline gradually until bottom is hit in late August or early September. **Steel:** Production of ingots returned to about the same rate as prevailed before the Independence holiday shutdowns.

- **INDUSTRIAL PRODUCTION**
  Week ended July 9 .... **132†**
  Year ago **162**
  Details on Page 71
- **PASSENGER CAR PRODUCTION**
  Week ended July 16 . **110,000***
  Year ago **127,502**
  Details on Page 68
- **INGOT PRODUCTION RATE**
  Week ended July 17 . **53.1%†**
  Week ago **42.2%**
  Details on Page 130

†Preliminary. *Estimated.

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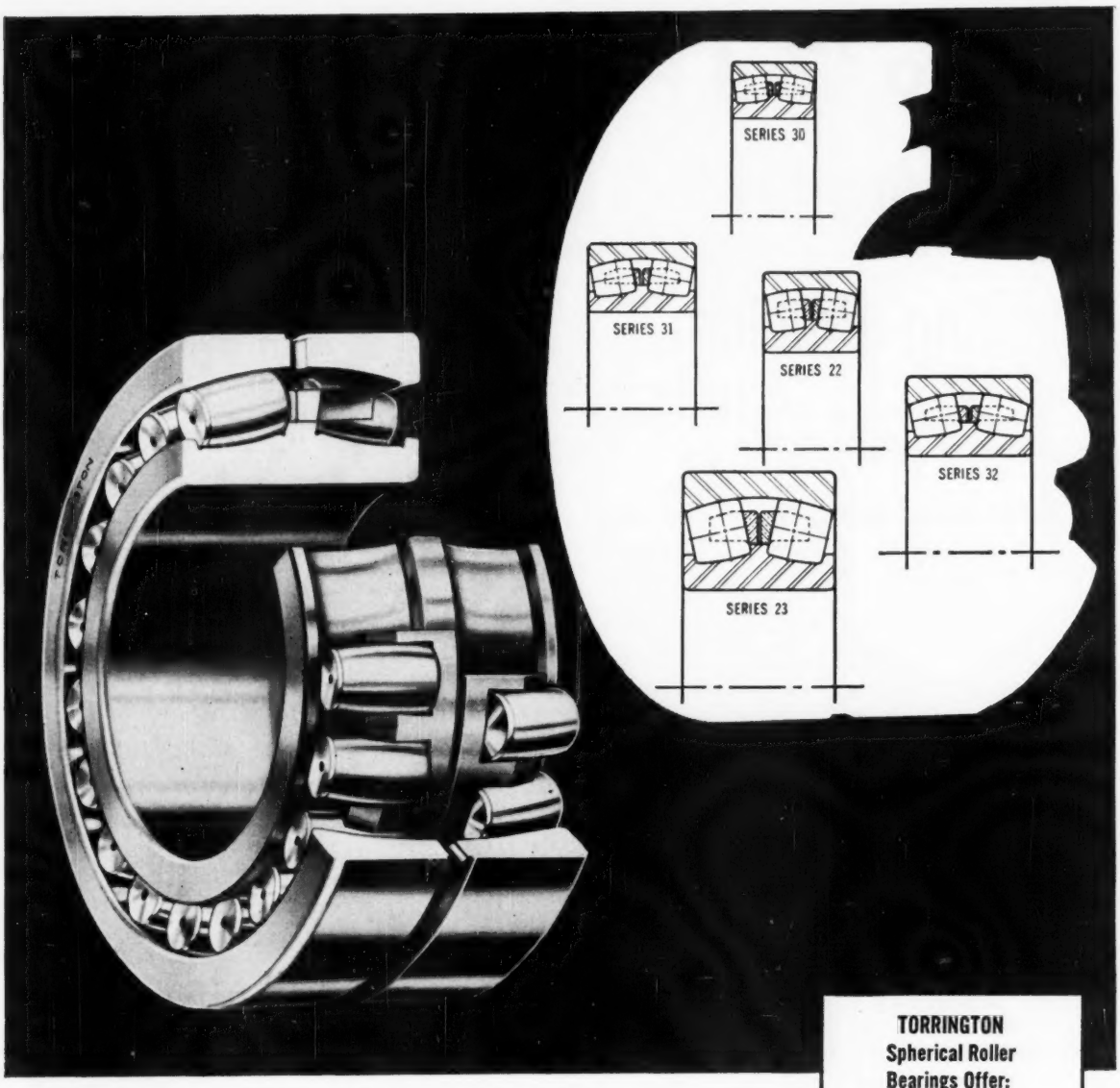

There's a Torrington Spherical Roller Bearing for your application

Bearings matched *exactly* to the job pay off in better performance, longer life, greater reliability. That's why it pays to specify carefully. And that's why it pays to choose Torrington Spherical Roller Bearings.

Whatever your space limitations or capacity requirements, the five series of Torrington Spherical Roller Bearings provide the right bearing for virtually every industrial application. You can design for straight bore or tapered bore with adapter. You can benefit from extra features such as lubrication groove and oil holes, or selected outside diameters.

Your use of Torrington Spherical Roller Bearings will assure exceptional operation and longer bearing life under the toughest conditions. They're made to Torrington's own uncompromising standards–the highest in the field of anti-friction engineering–by the manufacturer of every basic type of anti-friction bearing.

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- land-riding bronze cages
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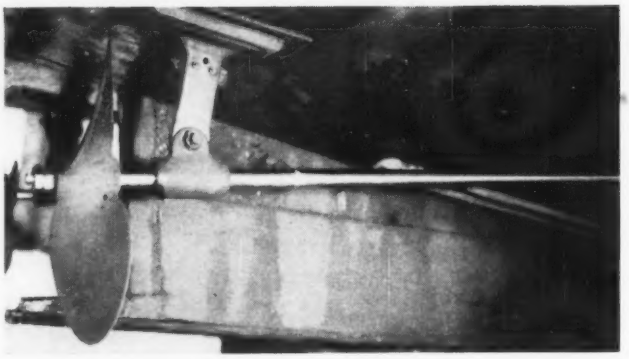
THE TORRINGTON COMPANY South Bend 21, Indiana • Torrington, Conn.

Armco 17-4 PH Stainless

Solves Another Shafting Problem

Boat shafts of Armco 17-4 PH resist bending, wear, seawater



New strut and propeller on the **Mary Reed**, with the same rugged 17-4 PH stainless shaft. It's hard to believe that this shaft, with a heavy propeller on the end, could operate without the supporting strut. **But it did!**

A 5-foot section of the propeller end of one shaft was left unsupported after the 39-foot charter fishing boat *Mary Reed* struck a submerged object. Normally, a boat so damaged would have required a tow, or be forced to return slowly to port on one engine. Not the *Mary Reed*. She was able to operate all day at cruising speeds in rough water. The reason: The unsupported shaft was made of Armco 17-4 PH Stainless Steel.

The **Mary Reed's** two 9-foot 9-inch shafts, 1¼ inches in diameter, are made of Armco 17-4 PH Stainless Steel. Both have been in service since the spring of 1958.

MORE ASHORE

Landlubbers are finding a growing number of uses for 17-4 PH, too. Longer lasting *shafts, valves, fasteners, hydraulic fittings,* and other products are produced from this special stainless. These 17-4 PH advantages show some of the reasons:

1. Superior resistance to bending and deflection. 2. High strength. 3. Excellent wear resistance and toughness. 4. Corrosion resistance in the class of 18-8 in many environments.

We'll be happy to send you more information. Just fill in and mail the coupon.

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Economic Illiteracy!

Economic illiteracy is probably the greatest single threat the U. S. must face.

That statement by Ray R. Eppert, president of Burroughs Corp., is one with which every American, whether he is manager or a worker, should agree.

As stated so succinctly by Mr. Eppert: "We are on the verge of a breakthrough into a wholly new level of economic activity, world-wide in scope, intensive in penetration.

"The emphasis in the U. S. has shifted from production to distribution . . . we can produce all we can sell . . . our problem is to sell all we can produce."

As Mr. Eppert points out, the Soviet Union can price her exports on any basis which her political ends require.

The Western nations that are our friends politically are also our rivals economically.

And there is plenty of competition among companies here at home.

As an answer to this economic dilemma, Mr. Eppert thinks that the U. S. must become a great marketing nation as well as a great producing nation.

Competition must be met head-on with better products, better production efficiency, and, above all, better marketing.

With this approach, Burroughs created 5500 additional jobs overseas between Jan. 1, 1950, and Jan. 1, 1960. At the same time, for every job added abroad, Burroughs created three new jobs in its U. S. operations.

Burroughs is one of a growing number of companies giving intense study to the rapidly changing economic facts of life—and doing something about them to protect and expand its business.

The U. S. no longer has an isolated economy in which neither management nor labor can do as it pleases.

The U. S. is part of a world-wide economy in which economic illiteracy can spell sudden death.

Irwin H. Such

EDITOR-IN-CHIEF

How McKay Tube Mills give Walker Brothers a competitive edge

"Our new McKay 5″ Tube Mill enables us to extend our production range to the larger sizes of Walkerduct and steel tubing. The mill affords close manufacturing tolerances and improved control over production schedules," says H. Newton Walker, President of Walker Brothers, Conshohocken, Pa.

High Quality Product—Walker Brothers has been a primary supplier of high quality electrical distribution materials to the commercial and industrial construction industry for fifty years. "Walker of Conshohocken" products include building wire, power and control cables, mechanical steel tubing, steel electrical metallic tubing, rigid steel conduit and underfloor raceways.

"This is the third McKay Tube Mill we have installed since 1951 to increase our capacity to manufacture conduit and raceways," continues Mr. Walker. "Each of these mills," he says, "has turned out a product consistent with our high standards of manufacture."

Better Production Economies—Walker Brothers has, in addition to the new McKay 5″ Tube Mill, two 3″-capacity McKay mills equipped with strip looping and welding equipment. These mills are generally used to produce ½″ through 2″ thin wall conduit on a continuous basis at a speed of 150 feet per minute. The new 5″ mill also operates at 150 F.P.M. and at that speed can easily produce Walker's line of 6.5″ x 1.5″ x .076″ rectangular raceway.

Mr. Walter Cubberley, Vice President, Production, states: "We have been most satisfied with the performance of this equipment. Performance of the McKay mill has more than met our expectations regarding versatility and cost savings."

Low Maintenance Cost—"There's something to be said for the design of this equipment, too," he says, "in that maintenance is, and has been, satisfactorily low regardless of the age of the machinery."

"This is very solid equipment, including the welder. In fact, I would say these are the best mills we could have selected for our type of operation," Mr. Cubberley concludes.

McKay Machine designs and builds electricweld tube mills for high speed production of ferrous and nonferrous welded tubing up to 20″ in diameter. The experience of nearly 25 years of pioneering in the design of tube making equipment is behind each modern McKay Tube Mill.

Write for literature, or send a description of your needs for prompt quotation to McKay Machine Company, Youngstown 1, Ohio.

Photo by Arnold Newman shows H. Newton Walker, President of Walker Brothers, speaking with Walter A. Cubberley (R.), Vice President, Production, and McKay sales engineer, Edward M. Lyden, about the high quality product Walker's new McKay 5″ Tube Mill is producing.

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FOR PROGRESS IN METAL PROCESSING

ALL ON ONE ORDER

You simplify procurement and assure satisfaction when you standardize on

MILWAUKEE WROT WASHERS

To get everything you need in washers — *on one order* — it pays to specify "Milwaukee Wrot" on every washer requisition you write.

One word tells the reason why: Specialization.

Milwaukee is the one prime source that has devoted more than 70 years to the volume production of quality washers. Special machinery — special production techniques — special facilities — special quality controls combine to make Milwaukee Wrot Washers the unmatched standard of superiority, the world over.

Whether your need is for "standards" or "specials," the complete Milwaukee line offers unrestricted selection. Factory stocks covering thousands of types and sizes, *plus* over 100,000 production-ready dies, make it unnecessary for you to tie up capital in long-range inventories.

TYPES AVAILABLE

- Manufacturers' Standard Size Washers
- SAE Standard Flat Washers
- Bellville Type Washers
- Sems Washers
- Narrow & Wide Rim Machinery Bushings
- Light Steel & Riveting Washers
- ASA Lock Washers
- Spring Tension & Wave Bend Washers
- Army-Navy Standard Washers
- Machine Screw Washers
- Axle & Carriage Washers
- Structural Washers
- Countersunk Finishing Washers
- Flat & Bevel Square Washers
- Drawn Center Washers
- Bedspring & Mattress Washers
- Slotted & Split Rim Washers
- Expansion Plugs
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- Dished Washers
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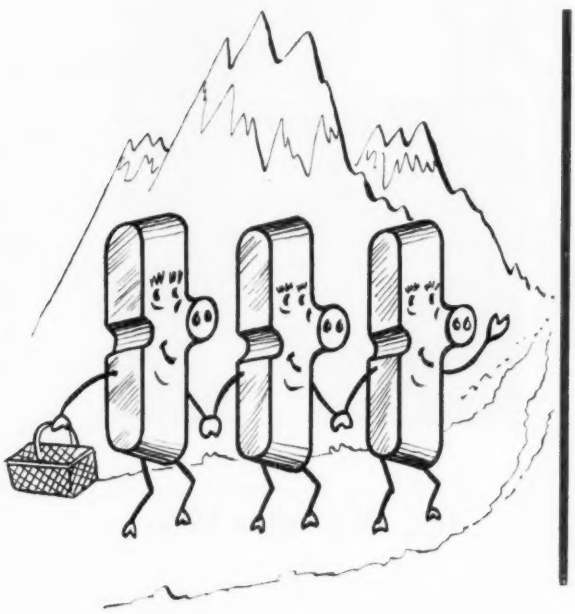


Aluminum's Little Three Go to Bigger Markets

IT TOOK some doing, but aluminum's Little Three (Anaconda, Harvey, and Ormet, which is jointly owned by Olin Mathieson Chemical Corp. and Revere Copper & Brass Inc.) are in the black or expect to be this year. Although they still aren't selling all they produce, the companies are charting their futures with confidence.

The climb has been particularly steep for Anaconda Aluminum and Ormet because unlike Harvey, they have no government stockpile contract.

Here's how each company stacks up in terms of size, markets, and plans:

Anaconda

Anaconda Co. is the oldest member of the group. It started primary production at its 60,000-ton-a-year reduction plant at Columbia Falls, Mont., in 1955. (Capacity is now up to 62,500 tons.) After the firm acquired Cochran Foil Co. last year, it formed Anaconda Aluminum Co., an autonomous subsidiary with headquarters in Louisville.

Besides the reduction plant, the $145 million Anaconda aluminum complex includes: A 510,000 sq ft sheet and extrusion mill at Terre Haute, Ind., with an initial capacity of 60 million lb yearly (85 per cent sheets, 15 per cent extrusions) and a potential output of 100 million lb; a light gage sheet and foil rolling plant, a foil laminating plant, and a rigid container plant, all at Louisville; another container plant at San Gabriel, Calif.; and a foil laminating plant at Fair Lawn, N. J.

Anaconda will produce 52,000 to 55,000 tons of metal this year and will probably be at capacity operation (62,500 tons) by yearend, says Archie P. Cochran, president. He looks for considerable expansion over the next decade. "Our consumption today is greater than our primary capacity," he points out.

Fabricating facilities are being expanded and updated. One goal: To replace every machine that's more than ten years old.

Anaconda hopes to eventually become fully integrated through the acquisition of alumina facilities. Several years ago, the company started a pilot plant operation to study the feasibility of beneficiating domestic clays. "We think we will be successful in getting a quality alumina economically," says Mr. Cochran. Anaconda now gets its alumina from Reynolds, but it will switch to Kaiser later this year.

Practically all of Anaconda's present business is by direct order. Plans are underway to set up distribution outlets through independent warehouses for the company's line of foil, rigid containers, plates, sheets, extrusions, rods, and bars.

Harvey

California-headquartered Harvey Aluminum Inc. has the most ambitious short term expansion plans of any of the small producers.

Currently the smallest of the Little Three, Harvey started operations at its 54,000-ton-a-year reduction plant (now upgraded to 58,000 tons) at The Dalles, Oreg., in late 1958. A fabricating plant in Torrance, Calif., turns out forgings, extrusions, rods, bars, tubes, and screw machine products.

On tap: A 25 per cent expansion in primary facilities to bring capacity to 73,000 tons a year; construction of billet casting, wire rod, and related facilities at The Dalles; and a merchant bar mill and conduit facilities at Torrance.

If adequate funds can be found, Harvey plans an early start on the final phase of its integration program. It means construction of an alumina plant (estimated cost: $30 million) to eliminate dependence on

ORMET'S COLLISSON:

'Potentials Everywhere'

Two years ago, N. Harvey Collisson took the helm as president of Ormet Corp., the nation's fourth largest producer (jointly owned by Olin Mathieson Chemical Corp. and Revere Copper & Brass Inc.). (He is also vice president of Olin Mathieson and general manager of its Metals Div.)

Mr. Collisson sees unlimited potentials for the metal. Take the transportation field: "Wherever you have a pound of dead weight against a pound of payload, the lighter material will force its way in."

With an eye to competition, Olin will produce only those products in greatest general demand, says Mr. Collisson. "We don't expect . . . under present market conditions . . . to get into the manufacture of end products."

Has the going been rough?

"Yes and no," says Mr. Collisson. "Competing with the Big Three hasn't been too difficult. The major problem has been operating in a market where production exceeds demand."

ANACONDA'S COCHRAN:

'Tons Will Follow Ideas'

"The secret ingredient in aluminum is imagination," believes Archie P. Cochran, president of Anaconda Aluminum Co., a 42 year veteran in aluminum. "As a small producer, we find it more desirable to sell ideas rather than metal. Tons will follow the ideas."

While Anaconda hopes to grow rapidly, Mr. Cochran believes it would be a mistake to cover every field of activity. "We like a profit, and to make one, we believe we should be selective in our markets. That's why I don't think we should produce everything from battleships to teacups." Mr. Cochran's formula: "Do certain specific jobs and do them well."

The technique of selling ideas in specialized areas lets a company "shoot at markets with a rifle rather than a shotgun," believes Mr. Cochran. "For example," he says, "we might specialize in containers. But we wouldn't think of our product just as a substitute for a tin can. I would like to get items that aren't even packaged now."

its Japanese supplier, plus development of bauxite deposits in either Jamaica or British Guiana. To round out its empire, Harvey intends to build an aluminum rolling mill (for sheets, plates, strip). Estimated cost: $40 million.

To help finance its ambitious expansion plans, Harvey went public last month. The initial offering of 750,000 shares (worth $15.6 million) was gobbled up the first day. No doubt part of the company's appeal to investors comes from its "put right" contract with the government—it guarantees a market for Harvey's metal. It can sell 270,000 tons of aluminum, or five years' full production, to the government. Last year, the company delivered 27,915 tons (about one-half its output) to the stockpile. Early indications are the figure will be about the same this year.

Ormet

Ormet Corp. is the largest and only fully integrated member of the Little Three. It's a captive facility. Olin takes two-thirds of its output, Revere one-third, for processing at their fabricating plants.

The $285 million complex, which

reached full operation last year, includes: An 180,000-ton-a-year reduction plant at Hannibal, Ohio; a 345,000 ton alumina plant at Burnside, La.; a $16 million marine terminal at Burnside; long term buying contracts at bauxite deposits in Surinam; three ore ships to carry bauxite from Surinam to Burnside; a fleet of 36 barges and one towboat to carry alumina upriver from Burnside to Hannibal; two-thirds ownership in an Ohio River generating plant.

No early expansion of Ormet facilities is planned, says President N. Harvey Collisson. Several millions have been spent to improve facilities.

Olin Mathieson

Olin Mathieson entered the commercial aluminum business in 1953 when it started operating its Roll-Bond facilities at East Alton, Ill. (Tubing is inflated within aluminum or copper sheets for heat exchangers.) It also operates extrusion plants at Gulfport, Miss., and Nesquehoning, Pa.; a conductor wire and cable plant at Chattanooga, Tenn.; and a 60,000-ton-a-year rolling mill (sheets, plates, strip) adjacent to the Ormet reduction plant at Hannibal. It also distributes pigs, ingots, billets, rods, bars, and screw machine stock nationally through jobbers and warehouses.

Looking ahead, the company says it will keep concentrating on selective markets and at present plans to stay out of end products.

Revere

Revere, long a household name in copper and brass, is well on its way to becoming a major aluminum supplier. Company spokesmen say: "We expect to grow with the aluminum market, and within the next decade, our aluminum operations could become as important as our copper and brass business."

Revere's research and development are being split into two segments: One for copper and brass, one for aluminum — separately staffed and in different locations.

Revere operates fabricating plants in seven cities and has a product mix that includes: Tubing (drawn, extruded, and welded); pipe, rods, and bars; coiled and flat sheets; converted foil; foil containers; eyelets and rolled moldings; extrusions, forgings; pigs and ingots. The company distributes nationwide through 50 independent warehouses.

With present facilities, Revere has capacity to produce from 6000 to 7500 tons of aluminum a month. Long range plans call for additional primary facilities in 1965-66. "As that occurs," says Revere, "we will also increase fabricating capacities." Adds the company: "In the meantime, if the aluminum industry should have another of its startling upturns, we would increase fabricating capacity at an earlier date."

Will Others Take the Gamble?

THE FAST GROWTH of aluminum over the past decade has been catching the eye of companies looking for ways to expand. In recent months, there has been a lot of talk about several companies reportedly on the verge of becoming producers. Here's what some of them have to say:

- Bridgeport Brass Co.: "No immediate plans to produce primary aluminum, but it is in the long range picture."
- Quaker State Metals Co. (division of Howe Sound Co.): "Still studying the possibility of entering primary field but have no present plans to do so in foreseeable future."
- Phelps Dodge Corp.: "No plans now to become a primary producer."
- Scovill Mfg. Co.: "No plans to become a primary producer."

A surprise entry into the ranks of potential producers: North American Coal Co., Cleveland. The company has vast reserves of mine wastes from which it plans to produce aluminum sulfate initially, then aluminum oxide (alumina). Eventually, it may turn out aluminum (see STEEL, June 6, p. 54).

The strongest current candidate for membership on the primary aluminum team is small ($7.6 million sales in fiscal 1959) United Pacific Aluminum Co., Los Angeles fabricator of bright and enameled aluminum sheet coil stock. The company will soon build a 20,000-ton-a-year reduction plant at Longview, Wash. It holds an option on land and reportedly has received a power allocation from the Bonneville Power Authority. United's entry can probably be explained by its access to the cheapest source of hydroelectric power in the U. S.

Entry Is Expensive

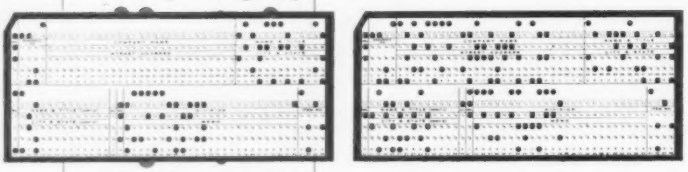
The biggest stumbling block is money. Metalmen estimate a minimum economical tonnage for initial production is 40,000 to 60,000 tons yearly. Rule of thumb for costs: $600 a ton, or $1200 a ton if a power system and raw material source have to be developed. That's a whopping sum, and bankers are shy about financing because of aluminum's low investment return.

Another factor that discourages newcomers: The industry has considerable overcapacity. Current capacity is 2,432,950 tons a year, and 196,800 tons will be added this year and next.

Add the market realignment and price weakness that will continue for at least another year, and it doesn't look like many companies will consider taking the plunge.

For as little as $345 a month . . .

Here's What DATA



- Prepare payrolls, write checks.
- Keep personnel records.
- Do cost accounting.
- Forecast sales, profits.
- Estimate material requirements.

LOOK FOR sales of data processing equipment to break all records this year as producers strive to broaden their markets.

They're aiming at the little guy—offering him new machines that will do more work for less money. And regardless of the size or complexity of his business, he's interested. He knows that he must have greater efficiency and more information than ever before to stay competitive. If he responds as expected, computer industry sales may soar to $1.5 billion this year (vs. $1 billion in 1959). There's something for everyone:

• For the price of a clerk—about $345 a month—you can rent data processing equipment that will help you with payrolls, labor distribution, cost accounting, and inventory control. International Business Machines Corp., New York, will ship you a Model 024 keypunch ($40 a month), an 082 sorter ($40), and a 402 accounting machine ($265).

• For about $200 a month, you can get a basic punch card installation that will compute your gross payroll.

• For $85 a month, you can rent a Keysort tabulating punch from Royal McBee Corp.'s Data Processing Div., Port Chester, N. Y. It automatically code punches and tabulates original records—"Making possible rapid, economical, and accurate accumulation of data in many accounting and production jobs."

• For as little as $10 a month, you can hire an independent service bureau to do a small accounting job faster and cheaper than you could.

• **Small Beginnings**—Often, small companies get into data processing by taking the system they can best use on a full term basis to meet their average daily requirements. For peak loads—big engineering jobs or major reorganizations—they farm work out on a fee basis to service bureaus operated by equipment manufacturers or independents, or they rent high powered equipment on bureau premises.

In many instances, small firms rent auxiliary equipment after success with basic units. Case in point: From 1955 to 1959, Wheeling Machine Products Co., Wheeling, W. Va., spent $300 a month for punch card equipment made by Remington Rand Div. of Sperry Rand Corp., New York, but used it only to compute gross payrolls. Billing was done manually by typewriter. Inventory control was done on a bookkeeping machine. Last year, the company installed additional equipment and watched its rent jump to $1450 a month. Added functions include cost accounting, inventory control, billing, invoicing, and sales analysis.

Says a company official: "We haven't been able to reduce our clerical staff, but our operations are most efficient, and we've been able to get much more information on sales and inventories. As a producer of pipe couplings, we sometimes have 28 million items in our shop, of which perhaps 200,000 are shipped in a day. There's a great possibility of error. Under our new system, we can see that we're putting into inventory exactly the type of parts that we're paying the men to produce. The cards show us what we made during the day, allow us to check output against production costs, and permit us to make additions to our perpetual inventory." The company's sales volume is between $5 million and $10 million a year. Current employment: 345.

• **Small Computers**—In the electronic computer field, there are several general purpose machines that are being marketed expressly for small and medium size companies. One of the newest, Monrobot XI, sells for $24,500 and rents for $700 a month ($600 a month on a five year lease). Made by Monroe Calculating Machine Co., Orange, N. J., a division of Litton Industries, it's a "solid state" machine (uses transistors instead of vacuum tubes). About the size of a standard desk, it weighs 375 lb.

In a somewhat higher price bracket but still within the reach of many companies are such machines as these:

• Bendix G-15, made by Bendix Computer Div. of Bendix Corp., Los Angeles. (It is sold for $51,000 and leased at $1530 a month.)

• IBM 1620, made by International Business Machines Corp., New York. (Sold for $74,500 and leased at $1600 a month.)

• LGP-30, made by Royal McBee Corp., Port Chester, N. Y. (Sold for $49,500 and leased at $1100 a month.) Last November, the company introduced a more powerful machine, the RPC-4000 ($87,000, $1750 a month). In April, it unveiled the RPC-9000 ($124,000, $2450 a month).

PROCESSING Can Do for You:

- **Control inventories.**
- **Schedule production.**
- **Load machines, assign labor.**
- **Show status of work in process.**
- **Figure labor distribution.**
- **Report yields.**
- **Measure performance.**
- **Determine variances.**
- **Prepare invoices.**
- **Handle accounts payable.**

• Univac 60, made by Remington Rand Univac Div., Sperry Rand Corp., New York. (Sold for $75,000 and leased at $740 to $1015 a month, depending on peripheral equipment.)

• Burroughs E-101, made by Burroughs Corp., Detroit. (The model built for scientific work has been adapted to commercial data processing and will sell for less than $25,000. A second model, the E-103, will soon be introduced at a slightly higher price.)

• **Sound Investments**—Do electronic computers pay off for a small company?

They can when they are applied to businesses that involve a lot of processing, paperwork, or engineering. The potential for improvement depends largely on the degree of mechanization that was previously in effect.

The extent of the payoff depends mainly on maximum utilization of the equipment.

Economy Forms Corp., Des Moines, Iowa, fabricator of steel forms used in concrete construction, purchased a Royal McBee LGP-30 outright in June, 1959, and applied it to a business with 300 employees and an annual sales volume of $5 million. Company officials regard the move as one of the best they've made. Here's why:

In the sales department, the computer compiles sales by commission category for each salesman and square footage of forms sold by salesman, by district, and total. In addition, it compiles customer-by-customer sales, giving a breakdown of each invoice.

In the accounts receivable department, it accumulates invoice totals, less payments and cash discounts. It totals accounts receivable for each customer and prints needed information if the total doesn't tally with ledger cards.

For the shipping department, the computer's sales analysis provides a current inventory of all items on the price list for all nine district warehouses.

For the accounting department, the computer accumulates: 1. By taxing body (city or state), the totals of taxes invoiced. 2. By taxing body, the total of gross sales invoiced. 3. By sales district, the total dollars invoiced, excluding interest, tax, and freight. 4. By sales district, the quantity of each inventoried item sold for use in cost-of-goods computation. 5. By sales district, the dollars invoiced for all stock and special products, as well as labor. 6. By sales district, the total inches, dollars, and quantities of items sold as well as items shipped. 7. Interest charges invoiced. 8. Prepaid freight and postage. 9. By sales district, the percentage of freight charges.

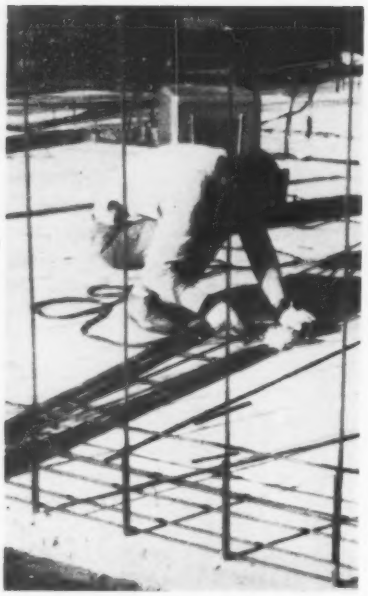
In foremen's weekly efficiency reports, the computer accumulates for all production employees their total hours worked, hours on incentive, hours earned on incentive, efficiency percentage, dollars below or above standard, and seven items of indirect labor — maintenance of tools, shop, and site, material handling, downtime, lost time, and set-up time.

• **Broader Markets**—In the medium price, general purpose computer market, two recent events are worthy of note:

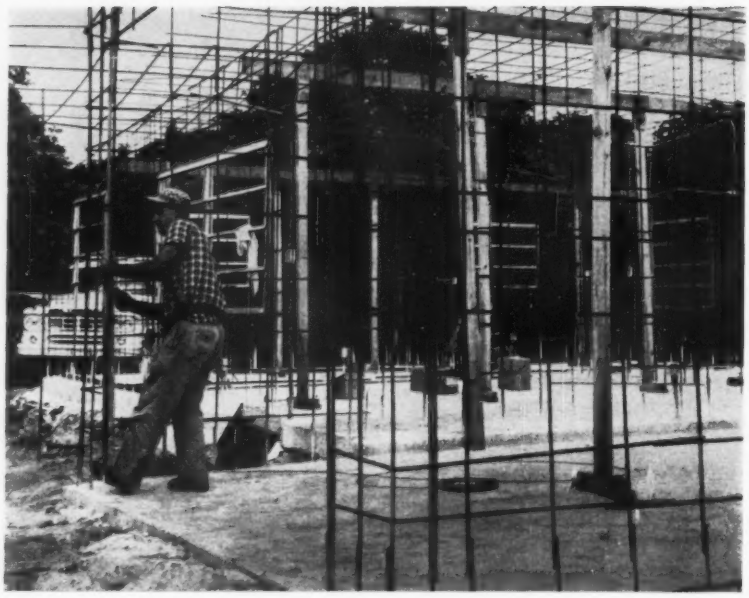
On June 20, General Electric Co.'s Computer Dept., Phoenix, Ariz., entered the field and announced development of a new, all transistorized system. Designated GE-225, it is aimed at a market that will embrace both scientific applications and business data processing. Incorporating a newly developed General-Compiler programing technique, the computer automatically translates English words and symbols into machine language. Thus it can be programed by personnel with little or no training in language of modern computers. Priced at $125,000 to $400,000, it will be leased at $4000, to $12,000 a month, depending on auxiliaries.

On Apr. 4, the Datamatic Div. of Minneapolis-Honeywell Regulator Co., Boston, introduced the Honeywell 400—a full scale, magnetic tape system "for the user who has the procedures and processing needs of a large company but with a smaller volume." Marketing officials of the company claim that the 400 will make high speed electronic data processing practical for more than 6000 of the 10,000 top U. S. companies. They visualize its use by small but growing businesses; by divisions of large, decentralized corporations; and by companies whose processing loads have seasonal or other peaks. The basic model will be available by next summer. It will rent for $8660 a month.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.



Welded steel rods form framework



With Uni-Con process, steel rods form walls and roof, join concrete slab

Steel Tries New Tack In Building Homes

STEEL RODS form the framework in a new type of home construction developed by Fred and Theron Federspiel, Largo, Fla., building contractors. Called the Uni-Con process, it is faster and less expensive than conventional building techniques, say the brothers.

Reinforcing steel in the floor slab is stubbed about 12 in. above the floor level. To the stubs are welded $\frac{5}{8}$ in. steel rods to form the framework for walls and roof. To the skeletal framework is welded a grid-like maze of $\frac{3}{8}$ in. steel rods in squares of 12 to 14 in. The rods are wired or welded together and bent to form ridges, corners.

Slabs of polystyrene insulation are positioned. Special formula coats of concrete are sprayed on the steel cage to a thickness of 5 in.

Coat of concrete is sprayed on

Finished Uni-Con home has conventional look but is faster, less expensive to erect, Florida builders say

Moto-Mower Inc.'s sales pickup was threatened by lack of engineering liaison. Gilbert E. Buske, right, tells how it could continue at full throttle as . . .

Mower Maker Sharpens Engineering

POWER MOWER SALES have cut a wide path in the lawn mower field. Today, annual styling changes and new model developments are as important to this business as they are to the automotive field.

• **Prospect**—More engineering is needed. So is better co-ordination among engineers, sales, and service staffs.

Moto-Mower Inc., Richmond, Ind., a subsidiary of Dura Corp., is an example. Its annual sales have tripled in four years.

During that time, most of the engineering has been done at headquarters of the parent corporation in Detroit. Only a single resident engineer and a few staff members operated on detached duty in Richmond.

That posed problems. The home office staff was so busy with current product engineering it had little time to develop new concepts and ideas needed to remain competitive in the mower field. Co-ordination with manufacturing, sales, and service was difficult. Moto-Mower felt it had to consolidate its product engineering at Richmond. That meant it had to set up a complete staff, starting virtually from scratch.

• **The Right Man**—The company picked Gilbert E. Buske, chief engineer, to do the job. He'd been hired from a competitor in 1958 and had worked with the resident group for a year.

He and Thomas Goodwin, assistant chief engineer, set up a three section department with objectives for each section clearly outlined. Richmond now handles all production engineering, testing, and specifications. The 25 man staff is closely tied to manufacturing, sales, and service. The arrangement leaves an engineering team in Detroit free to do the advance concept planning it never had time for previously.

• **Results**—Products designed for most efficient production, reduced manufacturing cost, and improved quality resulted.

Another benefit—A notable reduction in the number of engineering changes required after production starts. On a riding mower, for example, the number of afterproduction engineering changes was cut from 300 to 22.

Engineering Department Objectives

- **Keep management informed of engineering activities.**
- **Recommend budgets and control department expenses.**
- **Maintain a forward looking product development section.**
- **Maintain an aggressive testing and product sampling section.**
- **Maintain an accurate, flexible specification section.**
- **Establish sound personnel policies.**
- **Obtain maximum, long range planning for management to avoid crash programs.**
- **Make each employee aware of the need for competitive products in features, costs, performance, and appearance.**

Congress' Short August Session Will Emphasize Defense... Many Other Metalworking Matters Will Swamp Legislators

● **MUCH BUSINESS UNFINISHED** — When our elected representatives deserted Washington July 3 for the Presidential nominating conventions, they left behind enough unfinished work to keep them busy for another two months at least. But when they return Aug. 8, the pressure will be on to hit the campaign trail.

So you can't expect much to get done in a session that may last only a few weeks. Rather the legislators will be seeking stopgap measures to carry their campaign oratory through to Nov. 8. A great show of accomplishment will be made by the Democratic majority in both houses of Congress; the Republican minority will carp at the lack of solid work that has been completed.

Several measures coming up in August directly affect metalworking; many others indirectly. Three money bills are important: Foreign aid, public works, and appropriations to the Labor and Health, Education & Welfare (HEW) Departments. The House has already cut about $600 million from the President's $4.2 billion foreign aid request; the Senate has yet to act. The Senate must also act upon a House-passed public works bill (including Atomic Energy Commission funds) of almost $4 billion. Labor-HEW money is tied up in a conference between the Senate and House under the threat of a veto, if Congress does not prune some funds from HEW.

● **JOHNSON WILL LEAD SESSION** — Majority Leader Lyndon B. Johnson (D., Tex.) will undoubtedly plan the Senate's work with the aim of helping the Democratic party's chances of electing a President. Another social security increase is in sight with the almost certain passage of H.R. 12580. It calls for a moderate health program for the aged. Senator Johnson will also be pushing House leaders to get a school construction bill out of the Rules Committee. Both houses have passed bills but differences between them must be worked out in a conference, which, so far, the Rules Committee has not allowed.

Minimum wage will go to $1.15 an hour, if the Senate approves a House-passed bill. The Senate will consider the matter as soon as it returns. H.R. 5, the tax measure to spur private investment abroad, has been passed by the House, but the Senate Finance Committee has not acted. A housing bill which would cost $1.2 billion was approved by the Senate, but the House Rules Committee is sitting on it. A boost in the Small Business Administration's lending authority is certain to pass.

Action on two bills to help the lead-zinc industry (higher tariffs and a small subsidy program) has been demanded by the mining state legislators and Senator Johnson appears willing to put his prestige behind the measures.

● **DEFENSE APPROPRIATIONS O.K.'D**—Before going to the conventions, Congress did manage to get the Defense Department's fiscal 1961 budget approved. The final figure of $40 billion (not counting construction funds) was $660 million more than President Eisenhower asked for. Major increases in the defense effort: $240 million for the Polaris program, $200 million for airlift, $190 million for the B-70, $160 million for Army modernization, $145 million for an Air Force antimissile, $85 million for airborne alert, and $50 million for antisubmarine warfare research. Those increases were offset by an across-the-board 3 per cent procurement fund cut to tighten Pentagon buying.

It is not impossible that defense will be a major issue of the short August session.

● **FTC MOVES TO STOP KAISER**—Kaiser Steel Corp., Oakland, Calif., has been charged by the Federal Trade Commission with violating Section 7 of the Clayton Act. FTC wants to make Kaiser give up its 45 per cent interest in Allison Steel Mfg. Co., Phoenix, Ariz. Kaiser bought its interest in 1958.

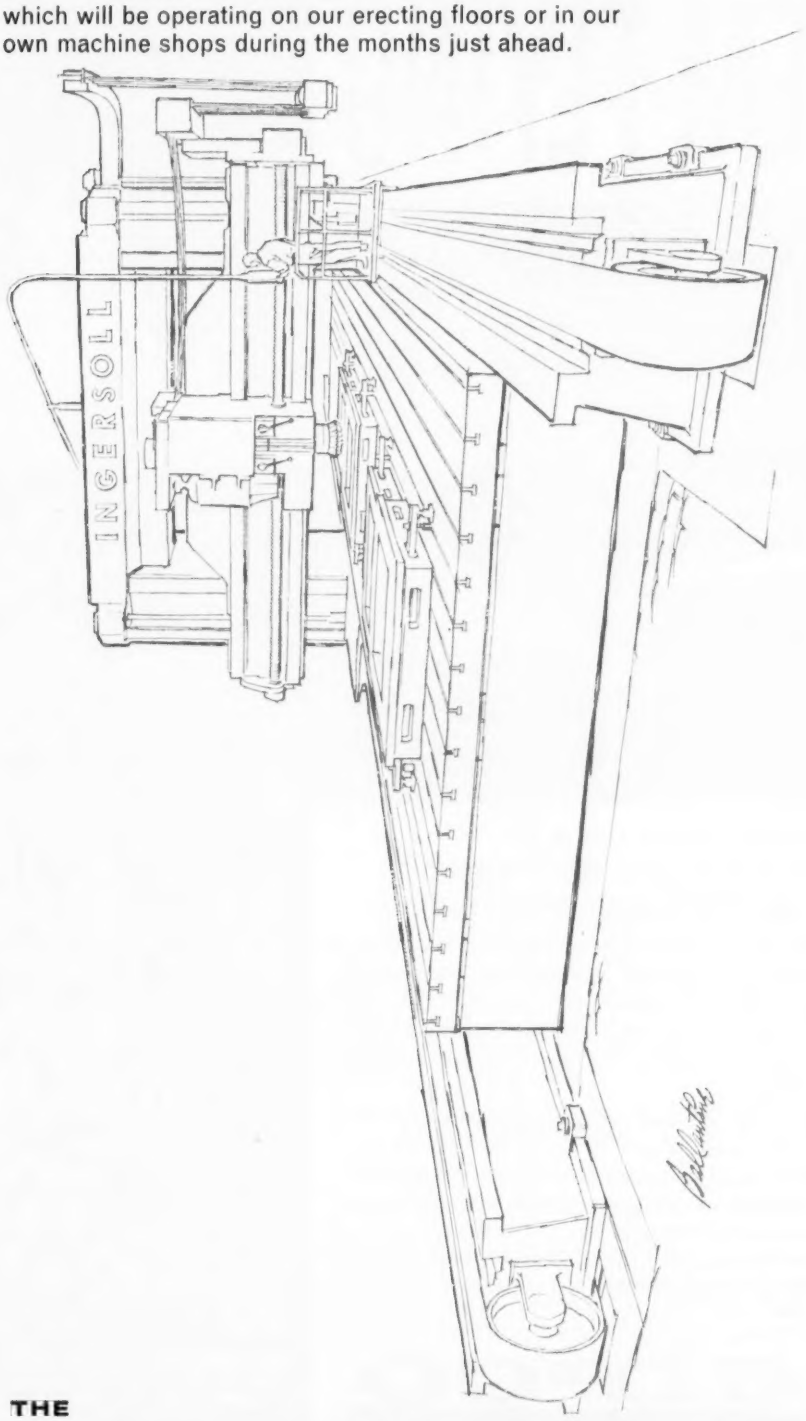
FTC believes the acquisition "may substantially lessen competition or tend to create a monopoly in the fabrication and erection of structural steel in Maricopa County, Ariz." Kaiser has until Aug. 10 to reply.

NEW AT INGERSOLL....

This is one of a number of

NEW INGERSOLL MACHINES

which will be operating on our erecting floors or in our own machine shops during the months just ahead.



A NEW 17-FT. GANTRY-TYPE ADJUSTABLE RAIL MILLING MACHINE: Using carbide tools to mill steel weldments up to 17 ft. wide, 6 ft. high, and 40 ft. long, this 220-ton machine, with a single 100 hp. milling head, will replace five planers. It is designed as a gantry-type machine to conserve shop space. The completion and testing of this machine will be of special interest to late summer visitors at Ingersoll.

THE

INGERSOLL

MILLING MACHINE COMPANY

ROCKFORD, ILLINOIS

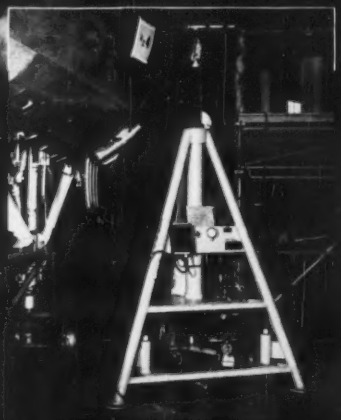
HOW ACIPCO HELPS CANADAIR KEEP 'EM FLYING

HYDRAULIC CYLINDER JACKS USED IN AIRCRAFT CONSTRUCTION AND MAINTENANCE EMPLOY ACIPCO CENTRIFUGALLY SPUN TUBING

The 10-ton hydraulic wing jack shown here is one of a number of different capacity jacks utilized by Canadair in its aircraft plants near Montreal. The hydraulic cylinders of these jacks are ACIPCO centrifugally spun tubing . . . and the manufacturers were supplied with Type 4130 normalized and tempered tubing in a variety of sizes ranging from 6½" O.D. to 11½" O.D.

"You may like to know, your material met our rigid specifications in every respect," wrote the manufacturer to ACIPCO, "and its excellent quality is such that the cylinders will render satisfactory, trouble-free service. The exceptional machinability of your tubing proved a definite asset in the manufacture of our cylinders."

ACIPCO tubing serves thousands of applications in hundreds of industries . . . economically . . . efficiently. May we serve you?



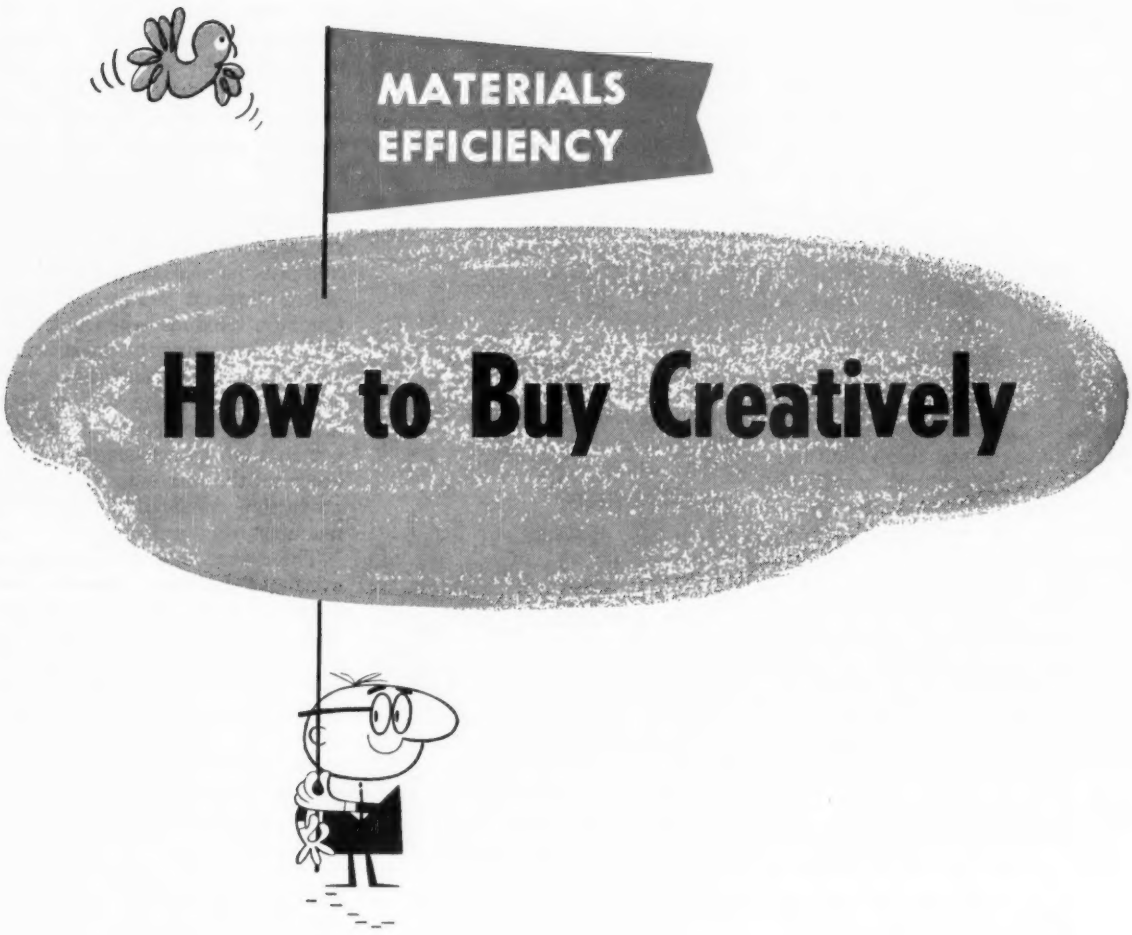
VERSATILE ACIPCO CENTRIFUGALLY SPUN STEEL TUBES

SIZE RANGES: Lengths up to 40 feet have been produced to meet modern machinery requirements. O.D.'s from 2.25" to 50"; wall thicknesses from .25" to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels, plain carbon steel and special non-standard analyses.

FINISHES: As cast, rough machined, or finish machined, including honing. Complete welding and machine shop facilities are available.

ACIPCO
SPECIAL PRODUCTS
DIVISION OF AMERICAN CAST IRON PIPE CO.
BIRMINGHAM 2, ALABAMA



How to Buy Creatively

EMERSON Electric Mfg. Co., St. Louis, used a computer to determine if it could replace electrical grade steel with armature grade for motor applications.

MINNEAPOLIS - Honeywell Regulator Co.'s Aeronautical Div., Minneapolis, keeps tabs on its venders' quality by evaluating them with a number like an exam grade.

LAMSON & Sessions Co., Cleveland, buys oil by the storage tank instead of by the drum and saves at least 22 per cent on its annual bill.

Those are just a few of the countless ways to get materials efficiency by buying creatively.

Only greater efficiency can meet the triple threat of inflation, spiraling wages, and adverse trade trends. And one good route to efficiency is through better purchase and use of materials. On the average, they account for more than half your costs.

It's easy to assume you're already doing a creditable job in this area because creative buying is an iceberg term: Not all its content is apparent. To get genuine creative buying, the climate must be right. The people must be right.

Climate and People

"Traditionally, the purchasing man's duties have been largely clerical, and he has often been frustrated," points out Andrew M. Kennedy Jr., vice president for purchasing and traffic at Westinghouse Electric Corp. "Too often, management has said to him: 'You get out the paperwork confirming the engineers' decisions. They'll tell you what to buy and maybe even where to buy it. You just try to get the best deal you can.' "

That climate stifles creative buying. Purchasing has to be an equal partner with other departments in the company, particularly engineering, production, and sales. If it isn't, the buyer with creative tendencies will submerge or leave, probably the latter.

The right climate, many materials men believe, starts with a concept of materials management. One definition: Materials management represents one, complete, undivided responsibility for providing the materials a company needs through transportation, inspection, storage, and delivery to point of use. Others go even farther—the control of materials into, through, and out of the plant. (See the first article in this series, July 4, p. 45.)

You don't have to go all the way with the concept—just far enough to win the freedom to act, essential for creativity in any endeavor.

How do you spot a creative buyer? His specifications have been

J&L Builds Foundation for Materials

ONE PROFITABLE ROUTE to the more efficient management of materials: Mechanize the information processing needed for a good control job. Jones & Laughlin Steel Corp.'s Cleveland Works has installed an array of IBM equipment (including a 305 RAMAC with 10 million digit storage and a 650 computer) to do that job.

A. M. Motter, corporate manager-systems, explains that the present data processing setup is a foundation on which J&L can build other automated systems. The firm now automatically gets the information on which to base decisions. It hasn't yet moved to the point where the machine makes the decision. A logical third step is to hook up the decision making equipment with process control equipment to put the decision into effect. But J&L says it isn't considering that move yet. (It is installing a process control computer on a new continuous anneal line at the Aliquippa Works, but it will not be tied to decision making machines.)

Where do you start? "The first thing you mechanize is the routine work (like typing up mill schedules)," Mr. Motter replies. Example: J&L receives an order for coiled sheet at the Cleveland Works. To schedule that production, the finished product information must be translated into material requirements at each stage of production: Number of ingots and size of mold at the open hearth; number of cuts per ingot, width, thickness, length, and weight of slab at the blooming mill, and like information at other production stages. The 650 computer translates that information at the rate of 3 to 5 seconds per order.

• **Customer Service**—The need to give even more rapid, reliable customer service in the competitive sixties triggered the decision to automate the data processing operation. Now, at 8 a.m., J&L can tell its customer the status of his order as of 11 p.m. the day before, reports J. R. Powell, works manager. J&L can promise deliveries more exactly within narrower time limits to meet customers' requirements.

• **Inventory Control**—J&L now has an IBM card for every piece of steel in process or in finished goods inventory. So inventories are more easily controlled, any item is easily located, physical inventory must be taken far less frequently, expediting is reduced, and any desired analysis of inventory can be made rapidly.

• **Production Scheduling** — The IBM setup will compute, mechanically, the schedules for each successive operation—from the open hearth through shipping. The product in process is represented by a card. Every operation performed on the product is recorded on the card. Example: You want to schedule tomorrow's production on the temper mill. You have the cards that represent all products ready to be run through that mill. The machine has lined them up to run in the most logical manner (by size, customer, or some other sequence) to give you the maximum production efficiency. (Example: Minimize roll changes.) But you still have flexibility. You can reshuffle the cards to put the "hot" orders through first. As Frank Cambest, production planning superintendent, puts it: "You can sit at your desk and arrange the cards like a giant could arrange the products out in the plant." The output on any one manufacturing unit becomes the basis for scheduling production on the next unit in the manufacturing process.

The system also permits you to avert bottlenecks. Suppose you have a jam in the finishing mill. You can check to see what items you should run through the annealing line to minimize that jam. The system permits rapid scheduling: "We can get an order at 4 p.m. and have it ready to go into the open hearth at 6 p.m.," reports John Daley, Cleveland Works systems analyst.

• **Order Status**—The IBM setup gives J&L the ability to know where every pound of steel is at any time. It can keep track of 20,000 orders simultaneously. That permits J&L

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drawn up by Richard Renck and Drs. George O. and Melany E. Baehr of the University of Chicago's Industrial Relations Center:

The creative person is emotionally free, uninhibited, willing to share ideas, verbally expressive, often bored with people, fluent with ideas, positive in temperament, a good listener as long as the talk relates to his own work, not particularly orderly in behavior but systematic in thought, often antisocial, highly reactive, impatient with people but persistent with ideas, impulsive, willing to take chances, fidgety, impatient with routine, generally above average in intelligence (but not always), fairly independent, usually artistic, perpetually dissatisfied.

Most creative people dislike clerical details. Fortunately, the coming of the computer and other forms of mechanization can free the purchasing department from much of that burden.

At Emerson, for example, purchasing decisions were simplified when a computer picked the lamination geometry that would give the best motor performance. The computer analyzed 720 possible designs for a single phase induction motor in 2½ hours (vs. at least a year if it had been done by hand).

The accompanying exhibit shows how Jones & Laughlin Steel Corp. uses computers in its operations to minimize detail work for purchasing and many other personnel.

Especially important for creative buyers is creative supervision. Deutsch & Shea Inc., New York manpower consultant, queried 105 authorities on creativity. They described this paragon as the ideal supervisor for creative people:

"He's sympathetic, friendly. He is able to relate co-operatively and stimulatingly with his subordinates.

to: 1. Tell a customer exactly what stage of production his order has reached. 2. Determine immediately whether it is behind schedule on any order, and if so, how far behind and why. Then the situation can be rapidly corrected. The next step in automation here will be to program the machine to automatically point out any failures to meet schedules; J&L currently examines the cards to determine that. The ultimate would be an inquiry system at each district sales office so that a salesman miles away could ask the machine where any order stands and be given a fast reply.

• **Accounting**—"Stick one card into the RAMAC and you can change 20 records," W. B. Budd, supervisor-data processing, notes. Suppose the accounting department wants to know the total production on the temper mill. The order status cards contain the information; so you just feed in the cards and call out the statistic. Or suppose you want daily costs at each work center; the machine will compute them. "You can also get cost per order or any other detailed cost analysis you want," points out Mr. Budd.

• **Management Tool**—The system gives J&L numerous opportunities to improve product quality and production yields. On the IBM 650, the company can simulate a production operation. It can then change one of the variables to see what results would come in productivity.

Or it can vary the mix in an open hearth to learn of yield, quality.

The company will also be able to evaluate raw materials. Example: What blend will give the maximum yield in a blast furnace?

THE KEY MEN in data processing at J&L's Cleveland Works (left to right): John Daley, systems analyst; W. B. Budd, supervisor-data processing; George R. Hemphill, co-ordinator-scheduling and order service

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One of his most significant attributes is his ability to be patient, tolerant, and flexible in thinking and acting. For him nothing should be frozen or permanent. He feels that he can take nothing for granted and that the volatile, evolving, and unconfined reaches of technological advances have not been tapped."

Probably no one can match that description, but the goals are worth shooting for.

Equally important for the supervisor is to know that these things motivate the creative man:

1. He wants to solve problems.
2. He craves personal gratification.
3. He seeks prestige.
4. He wants more money.
5. He wishes an advance in title.
6. He has a strong competitive instinct.
7. He desires fringes (like bonuses).

Note that money is fourth on the list. The passion to solve problems is the creative man's strongest motivation by far. Drs. Baehr urge the supervisor to recognize that to improve his supervisory technique. They also advise:

1. Genuinely delegate.
2. Give goals but not methods.
3. Give recognition to creative buyers through title, status, and money without burdening them with administrative duties.
4. Be the champion of creative people with top management.
5. Supervise firmly but not too closely.

Where to Be Creative

One way to nurture creativity is to direct it into the channels where materials efficiency can be improved the most. The converse is just as true. Hundreds of routes to effi-

ciency are open to you. Only you can pick the most fruitful one or ones. Materials specialists say ten stand out. They're highlighted here and will be detailed in ten succeeding articles of this series:

• **Make Materials Work Harder**—The president of a company making television sets asked his purchasing people to suggest the cheapest cabinet to contain a TV set. Their answer: A paper bag. The result: A molded paper cabinet impregnated with plastic which has been successfully marketed. Asked for a slightly better container, the purchasing people answered: A garbage can. That led to enameled steel enclosures. Experts advise always to consider alternate materials.

• **Look What New Materials Can Do**—Jack Walter, manager-materials at Radio Corp. of America's Home Instruments Div., believes that many smaller manufacturers, particularly, should welcome the new vinyl coated steels. They're ideal for the company that has good production facilities but not enough room or money for finishing operations.

• **Pick the Right Material**—U. S. Steel Corp. offers at least 10,000 different steels. Other producers of materials have a comparable array. How to keep track of them all? Minneapolis - Honeywell, General Electric Co., and many others are using computers to help with the job. And the materials suppliers can help you too. John Reinhart of U. S. Steel, for example, brings steels to the attention of auto engineers and designers, as an aid in creative buying.

• **Use Suppliers' Brainpower** — American Motors Corp. does. Listen to its president, George Romney, talking to venders: "We have decided to continue to supplement our own . . . activities by relying on your greater specialization . . . we can progress most effectively by drawing intelligently on the greater reservoir of skill and capacity built up by our suppliers."

• **Get Higher Reliability** — "You must design reliability into your products, not try to test it in," says E. H. Olson, engineering director, Aeronautical Div., Minneapolis-Honeywell. For example, an M-H system to control pressure in the front end of a plane and to get maximum air through the engines has never had a flight failure—as a result of setting reliability goals before beginning design or specifying materials to go into the system.

• **Standardize for Lower Costs**—Clark Equipment Co., Buchanan, Mich., is classifying and coding 90,000 parts to achieve savings that it believes will be "substantial." A company with a $300,000 stock of bearings tried the creative approach of standardization and can now get along with a $30,000 inventory without danger of stockouts.

• **Teamwork Trims Costs**—Buyers have to work effectively with other departments and among themselves if they want to do a creative job. E. F. Andrews, director of purchases for Allegheny Ludlum Steel Corp., makes this point: "Suppose we have 50 bearings in stock, with an average annual corporate usage of 60. Suppose we have five plants and carry ten at each site. Assuming that the bearings cost $1 each, we have an investment of $50, plus a 20 per cent cost of possession, for a total stock cost of $60. When we use centralized inventory control and work more closely with the inventory man at each plant, we can keep two bearings at each plant (instead of ten) and hold ten in reserve at a central point. When one is consumed at a plant, we immediately replace it. Thus, we have only $20 tied up in bearings. Figuring 20 per cent for cost of possession, we have a total cost of $24 instead of $60."

• **Slash Scrap Costs**—One creative way to do that is to give the scrap disposal job to the purchasing department, not sales. Henry Van Noy, director of administration, Tasker Instruments Corp., Hollywood, Calif., argues it this way: "By contrast with the sales function, the purchasing department has some knowledge of the business channels for returning the material to productive use because it acted to obtain it originally." Frank J. DeCrane, director of purchases for Lamson & Sessions, is among the growing body of purchasing managers who handle scrap sales.

• **Get More for Less**—This involves legitimate price negotiation, the hunt for lower-cost suppliers, and aid to venders in cutting their own expenses. Minneapolis-Honeywell's vender quality rating system can help in all three approaches toward getting more for less. Each vender gets a monthly or quarterly rating. If it's low, a Honeywell committee determines the reasons, then initiates corrective action. If the supplier doesn't improve, he's out.

• **Make Your Buyer a Pro**—The dishonest, poorly trained, or unprofessional buyer will never be creative. Says T. O. English, general purchasing agent for Aluminum Co. of America and past president of the National Association of Purchasing Agents: "Needed are company codes for buying conduct, company plans for buying organization, and company programs to train the buyers after they have been graduated from college."

The right climate, the right people, and the right direction cannot guarantee creative vigor. They can only help sustain it. The source of creativity in buying or any other activity is as mysterious as that of life itself—and just as fragile. Handle with care.

Materials Efficiency

Make Materials Work Harder

That's the article coming up Aug. 1 in STEEL's 1960 Management series. For a free copy of any or all articles in this 13 part program on materials efficiency (which started July 4 and will run every other week for the rest of the year), write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Also available on the same basis is the companion series on production efficiency which appeared during the first half. Use of material like this may win you $1000. For details, see Pages 5 and 6.

INTERNATIONAL SILVER ANNEALS 35,000 LBS. OF BRASS & CUPRO-NICKEL A DAY

in these Power Convection bases

One man is now as productive as many 2-or-3 man annealing departments, and the tools that make him so valuable are these Surface Power Convection* annealing bases. Along with his production rate of 35,000 lbs. a day, he gets exceptional quality in his finished brass and cupro-nickel coils. Power Convection equipment never lets the temperature vary more than 10°F from top to bottom of a load. While one load is heating or soaking, a second is cooling, and the operator prepares the third load on its tray. A single crane handles all loading and unloading.

All the operator does to start a heating cycle is make a single electrical connection between cover and base. The International Silver Company, Meriden, Connecticut, is one of many manufacturers who are realizing higher earnings from Surface Power Convection equipment. You can be another, simply by calling Surface Combustion, 2385 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ont.

*Trademark of Surface Combustion, Division of Midland-Ross Corp.

Surface®

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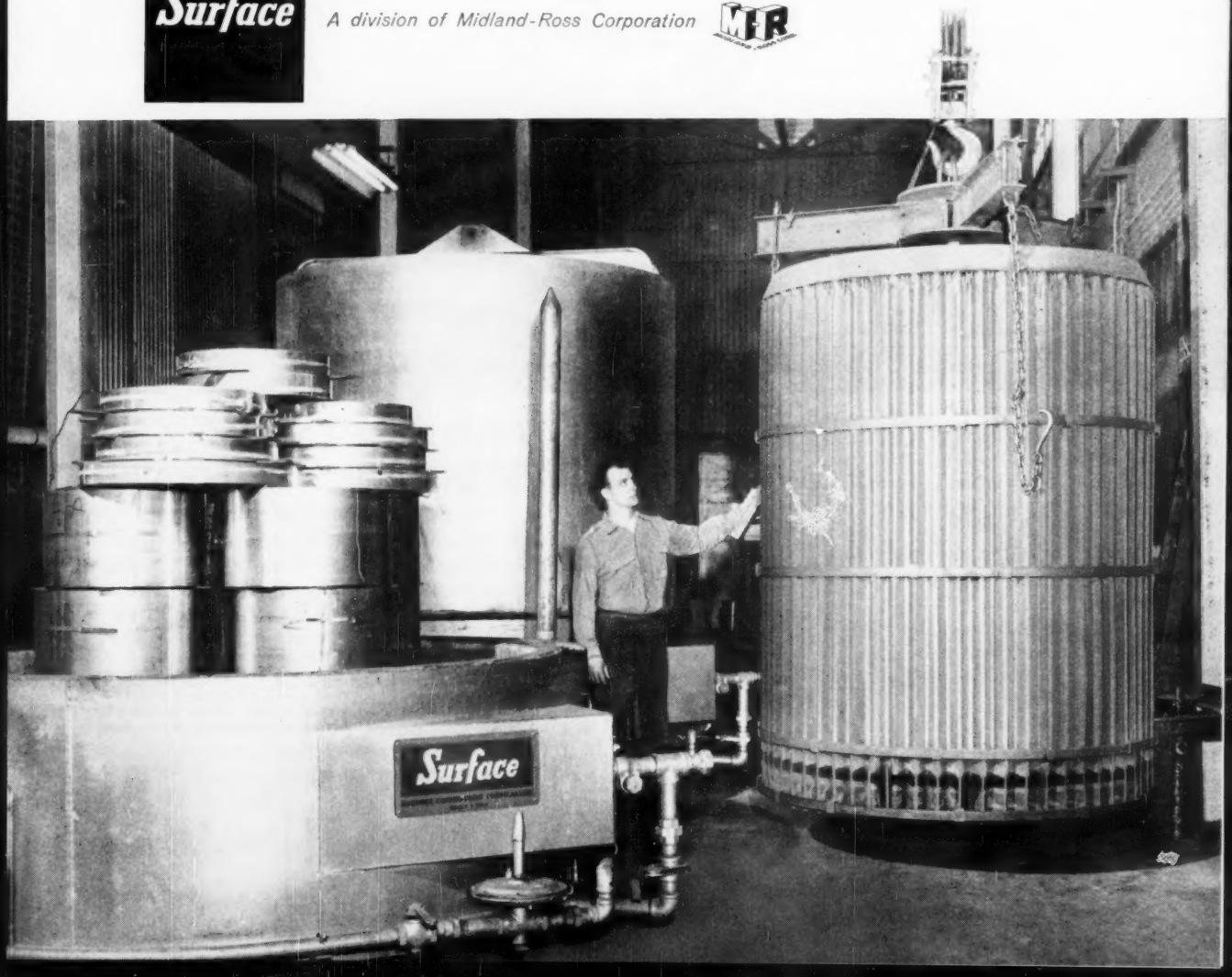


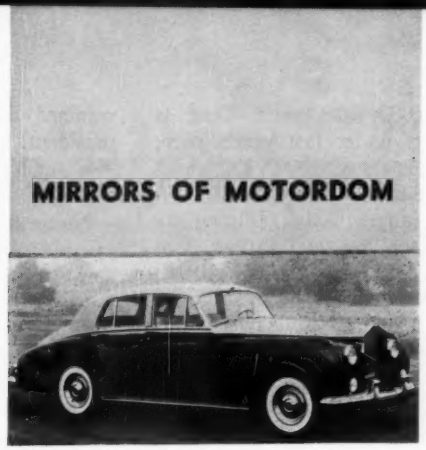
YOU SAVE ON INSTALLATION AND ASSEMBLY WHEN YOUR "SPECS" READ HYATT

Because it saves assembly time, Hyatt makes all separable races interchangeable. You can press a race on the shaft at one work station . . . join it to any assembly of the same part number at a later stage of production. As a result, you save time and cost when you specify Hyatt Hy-Roll Bearings. Hyatt Bearing Division, General Motors Corporation, Harrison, N.J.

Replacement bearings available through United Motors System and its authorized bearing distributors.

HYATT *HY-ROLL BEARINGS*

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM GENERAL MOTORS RELIABILITY



Volkswagen and Renault still show sales gains, but U. S. compacts are pushing back high priced foreign automobiles as . . . .

Foreign Car Sales Tide Turns

	Registrations of Foreign Cars	
	1960	1959
January	40,484	36,225
February	42,704	40,585
March	50,310	49,234
April	48,283	53,715
May	45,000	52,473
June	42,000*	57,211
	(268,781)	(289,443)

Source: *Ward's Automotive Reports.*
*Projected.

FOREIGN CAR registrations have been slipping steadily for three months. So a few motor moguls claim the import battle is over. But they're wrong.

Foreign cars that are directly competitive (pricewise) with domestic compacts have been squeezed, but the leaders—Volkswagen and Renault—are selling better than they did last year. The outlook: Import sales will never again reach 1959's record 609,539, but cars like Volkswagen will continue to clean up until Ford and the other automakers get their smaller models on the market. Earlier forecasts (500,000 foreign registrations in 1960) still look good.

• **VW High**—Midyear sales of Volkswagens are around 76,000 compared with 54,000 last year. Renault has hit 40,000 units. In 1959, it registered 38,408 units in the first six months. The continuing success of these cars proves that there's still a passel of compact car buyers who are more interested in lower priced vehicles than they are in higher horsepower and added style.

• **Here's Why**—Comparison of VW and Falcon specs shows why the German car retains its appeal. The Volkswagen is 59 in. high against Falcon's 54.5 in. To many, the 1609 lb car (it's 160 in. long) is too small for crowded U. S. highways. They prefer the 2288 lb Falcon with its 109 in. wheelbase and 181 in. length. But to the real economy shopper, lack of size doesn't seem to matter much. Nor does the fact that VW has only 36 hp while Falcon sports 90. The buyer is interested in Volkswagen's port of entry list price of $1565. The Ford compact sells for $1912.

Once he climbs inside the import, the buyer discovers he has picked up some extra benefits. Front headroom is 38.6 in. against 33.8 for the Falcon. Front legroom is 44.5 compared with the Falcon's 43.3 in. The headroom isn't so important (Falcon's is adequate), but that extra inch of legroom can be a real asset on a long trip.

Falcon, Valiant—and to a lesser extent Corvair—have what most of today's compact car buyers want. Falcon sales reached 240,000 in the first half, which is more than VW sold during all of '59 and '58. But Volkswagen's uptrend is selling Ford and Chrysler on the idea of bringing out smaller cars to hit this economy fringe of the compact market.

• **Rest Slump**—Aside from VW and Renault, other imports aren't faring so well. Their losses are more significant in light of the higher selling rate this year. There has been some juggling among the next eight imports, but all are below their 1959 performances. Most recent figures show the English Fords and Opel in the third and fourth spots, with

about 10,000 sales each. Opel is 2000 units under last year's pace; the Ford is down 4000.

Fiat, Simca, Triumph, Austin-Healey, Vauxhall, and Hillman are also in the "top ten" listing. Fiat sales are 8700 against 11,600 last year. The rest have sold about 5000 units each, and all are between 2000 and 4000 units lower than they were in 1959.

• **No Chumps**—So far, the import slump is going pretty much the way autodom predicted it would, but ranking overseas competitors are fighting back. They're adding more dealers, increasing advertising budgets, and introducing restyled models. A few have cut prices, and more are expected to do so in '61.

An estimated 15,500 dealers are handling import cars either on an exclusive basis or in combination with larger American automobiles. That's almost 1500 above last year's total. Citroen is tooling up a compact car in the VW and Renault class. It will be introduced later this year, says Charles Buchet, manager, Citroen Cars Corp., New York.

The English Fords are being restyled, and sportier hardtop models will be added to the lineup. First shipment of a Fiberglas body car, the France Jet, has arrived in this country. It's 130 in. long and has an air cooled, 19 hp engine. Port of entry price is $1595. Renault and Fiat have already announced price cuts ranging from $50 to $200 in some of their more expensive lines. There's some concern in the industry that Volkswagen may start importing its standard model which sells for $200 less than the de luxe job it now markets in the U. S.

Why Did Newberg Quit?

Despite a townful of talk, no one outside a small corporate circle really knows why William C. Newberg resigned as president of Chrysler Corp. after a two month reign, but speculation centers on a basic theme which may be close to the truth.

Chrysler says only that the resignation was due to "differences of opinion on certain corporation policies." L. L. Colbert, chairman and chief executive officer, has been re-elected president. E. C. Row, who had been awaiting retirement, has resumed his old post of first vice president. And nobody—but nobody—is saying anything more for the record!

Naturally, the rumors haven't stopped. At first, they ranged from stories of a political fight to tales of fisticuffs between Messrs. Newberg and Colbert. You also hear of stockholder pressure, crackdowns on alleged supplier kickbacks, and disagreement on sales procedures and new model programs. The most persistent story runs something like this:

• Chrysler has been striving for more efficient operations for several years. Efforts in quality control, sales organization, and product engineering were beginning to pay off, claim company men.

• Purchasing practices were still a problem. More than any other automaker, Chrysler's name crops up when talk turns to overbuying, kickbacks, and rigged bids. Reports that company executives held major stock interests in supplier firms have been denied by Mr. Colbert.

• When Mr. Newberg took over as president he was heading up a massive cost cutting campaign. Purchasing reportedly was to be a prime target area. Rumor has it that Mr. Newberg's attempts to institute some basic changes in purchasing policies ran against the feelings of several majority stockholders, which include members of the Walter P. Chrysler family. Mr. Newberg lacked the internal support to back his play and either had to fall into line or get out.

Discussing the situation, a former high level Chrysler executive told STEEL: "For my money, Bill Newberg has more political knowhow than any man I've ever met. I also think he was the ablest executive in the company. I can only conclude that for some reason or other he bumped headlong into Tex's title of chief executive officer."

With the stockholder backing that's reportedly behind Mr. Colbert, Mr. Newberg didn't have much choice.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
6 Mo. Totals	3,809,578	3,284,012
July		555,410
August		239,149
September		258,151
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
June 11	139,423	127,029
June 18	137,641	129,270
June 25	141,247	127,217
July 2	125,868	108,397
July 9	90,799†	123,147
July 16	110,000*	127,502

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Soaking Cleans Dies Fast

Cleaning diecast dies of scale and solder without etching the die surface can be a time consuming task. GM's Ternstedt Div. has come up with a method that cuts cleaning time to minutes and results in a better job.

Dies are loaded into a heavy gage steel tank where they're soaked in hot water and a mild caustic solution to loosen scale and surface materials. Air agitation helps.

The dies are then transferred to a cleaning booth where a steam hose blasts off the material that has been loosened in the soaking tank. Rustproofing solutions can also be fed through the hose. Result: cleaner dies in half the time making for cost savings and better casting quality.

Exhaust Notes

• GMC Truck & Coach Div., Pontiac, Mich., has added a heavy duty V-8 diesel truck engine to its family of V-6 and V-8 powerplants. The 2 cycle diesels will be installed in three, heavy duty GMC tractor models. The engine is 45 in. long and comes in 236 and 260 hp ranges. Gross torque is 733 ft-lb at 1200 rpm.

• Uncle Sam's Air Force has ordered $3.5 million worth of platinum electrode, aircraft sparkplugs from AC Spark Plug Div., General Motors Corp. They'll be used for cargo and refueling planes.

PRODUCT INFORMATION

N/D sound booth for analysis of electric motor noise, mounted on springs and constructed with non-parallel walls, assures manufacturers a *scientific solution* to electric motor noise problems. Motors are tested with special electronic sound evaluation equipment.

How N/D Minimizes Electric Motor Noise!

In New Departure's full-time noise analysis program, a unique sound booth and special electronic sound level equipment are used to pinpoint and evaluate electric motor noise. Inside the booth, a condenser microphone picks up air-borne noise from the running motor. Outside, the signal is electronically registered and recorded.

By changing one variable at a time, such as bearing or mounting design, or lubricant, N/D engineers are able to select the proper combination that results in the quietest motor operation. That's why you'll find New Departure precision ball bearings specified for electric motors to be used in quality home appliances, instruments, fans, hand tools and other applications . . . for greater consumer sales appeal.

If you have an electric motor noise problem, contact the N/D Sales Engineer in your area. For additional information call or write New Departure Division, General Motors Corporation, Bristol, Connecticut.

NEW DEPARTURE

BALL BEARINGS

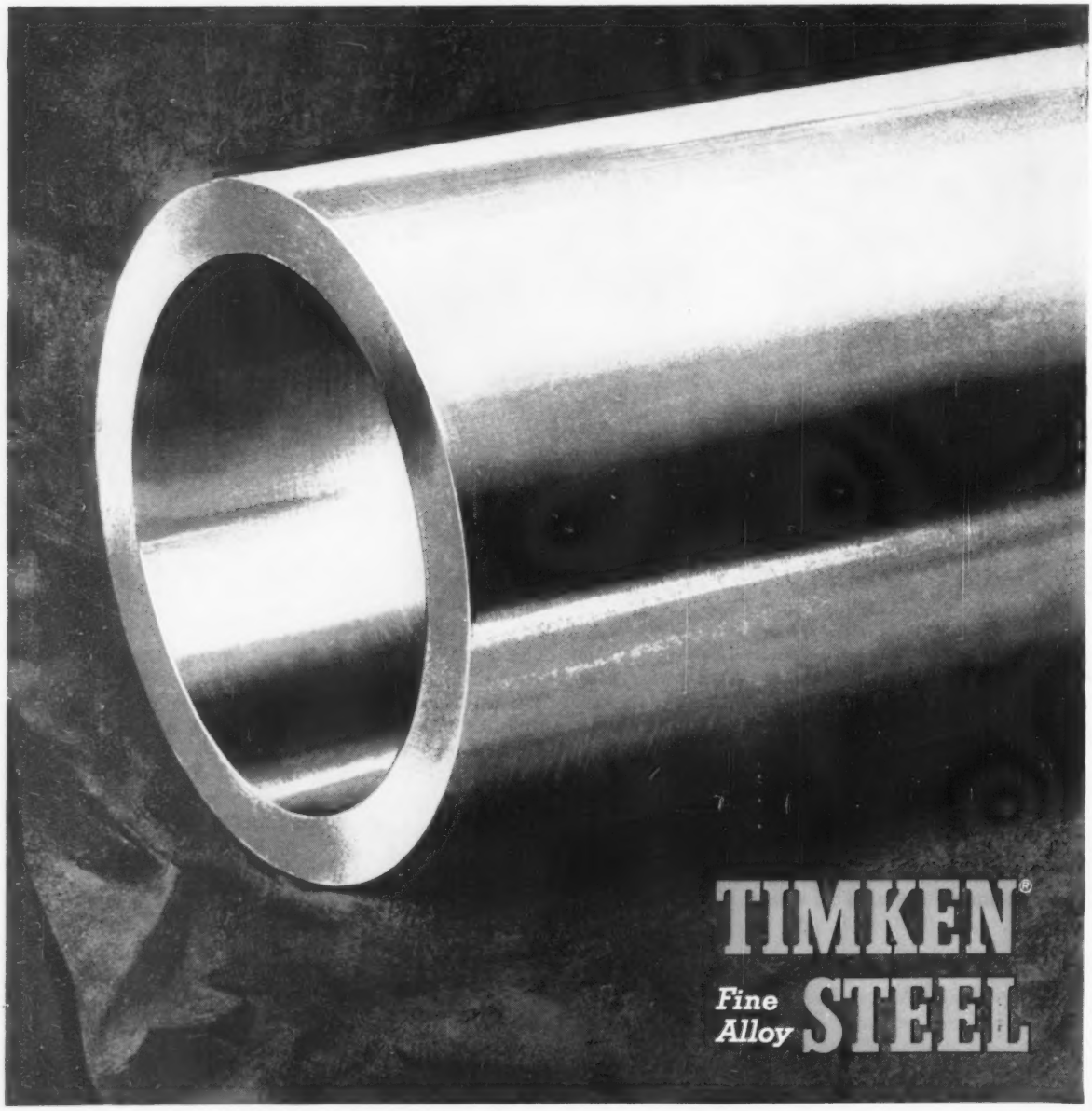
proved reliability you can build around

This tubing saves you money before you start your hollow parts

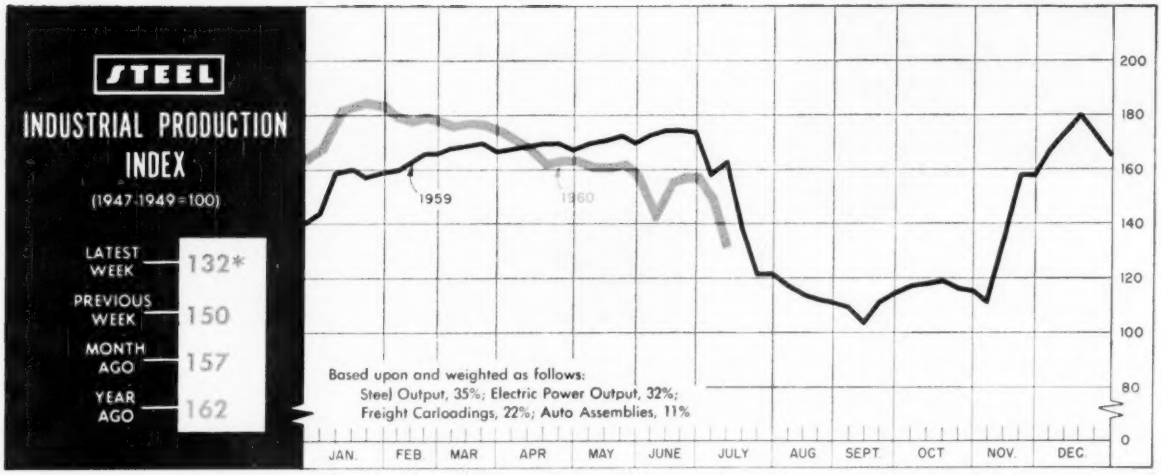
You save with Timken® seamless steel tubing before you start your hollow parts because the hole's already there. No costly boring out of bar stock for you, less waste steel. Your finished parts will have uniform quality, too. That's because we make Timken steel tubing by rotary forging a solid round over a mandrel, thoroughly working the metal inside and out. Result is the tubing has fine forged quality and uniform spiral grain flow.

When you buy Timken steel you can be sure of: 1) *Quality* that's uniform from heat to heat, tube to tube, order to order; 2) *Service* from the experts in specialty steels; 3) *Experience*—over 40 years of it—in solving tough steel problems.

Our engineers will be glad to help you cut your costs by recommending the most economical tube size for your hollow parts job. It's guaranteed to clean up to your finish dimensions. Call or write your nearest Timken Company Sales Office, or The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*



TIMKEN ALLOY STEEL AND SEAMLESS STEEL TUBING ARE AVAILABLE FROM STEEL SERVICE CENTERS IN 44 CITIES IN THE UNITED STATES



*Week ended July 9.

Second Half Will Look Better

FROM NOW ON, 1960 will look better by comparison with last year —and not entirely because the last half of 1959 was scarred by a steel strike.

In many respects, the first half of 1960 was a good period, but it suffered in comparisons with the first half of last year when the economy was buoyed abnormally by inventory stocking for the steel strike.

Even though there has been a weakening in some economic sectors this year, the economy is still at high levels.

• **Reason**—The fact that the economy as a whole has been riding along at an all-time high during the last two quarters has been pretty well obscured. There has been a sharp decline in the steel industry, but too often this decline has been compared with the year-ago situation when demand for steel prior to the 116 day strike was at an abnormally high level. Some of the important weekly data have also suffered by similar comparisons: Railroad freight carloadings, output of electric energy, truck tonnage hauled, coal production, and, to a lesser extent, such overall indicators as department store sales.

Some of those comparisons have been reflected in STEEL's industrial production index, which has been running below the year-ago level since early April.

• **Turnabout**—Beginning this week, things will look relatively better than they have for a long time. Even though steel production is depressed, it will be considerably higher than it was during the steel strike. Railroad freight carloadings are expected to be 15.3 per cent above the corresponding 1959 rate in the third quarter. Output of electricity again will be as much as 8 or 10 per cent ahead of the year-ago figures. Truck loadings will apparently rise sharply compared with similar 1959 data. The

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,513[1]	1,203	1,097
Electric Power Distributed (million kw-hr)	13,350[1]	14,247	13,502
Bituminous Coal Output (1000 tons)	1,775[1]	9,025	1,840
Crude Oil Production (daily avg—1000 bbl)	6,820[1]	6,811	6,802
Construction Volume (*ENR*—millions)	$518.7	$686.4	$585.7
Auto, Truck Output, U. S., Canada (*Ward's*)	110,176[1]	155,574	158,623
TRADE			
Freight Carloadings (1000 Cars)	480[1]	549	554
Intercity Truck Tonnage (changes from year ago)	+1.3%	−6.6%	+27.1%
Business Failures (Dun & Bradstreet)	278	296	244
Currency in Circulation (millions)[3]	$32,155	$31,867	$32,105
Dept. Store Sales (changes from year ago)[3]	+15%	+5%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,061	$27,064	$22,767
Federal Gross Debt (billions)	$286.3	$286.1	$284.5
Bond Volume, NYSE (millions)	$20.3	$24.9	$29.1
Stocks Sales, NYSE (thousands of shares)	11,816	14,820	18,720
Loans and Investments (billions)[4]	$103.4	$103.8	$103 5
U. S. Govt. Obligations Held (billions)[4]	$25.4	$25.6	$30.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	232.2	232.4	221.3
All Commodities[7]	119.4	119.4	119.4
Commodities Other than Farm & Foods[7]	128.3	128.3	128.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

"MAKE EVERY MOVE COUNT!"

This basic axiom has special meaning for production lines that use close-tolerance small diameter tubing. Perfection in the tube puts profits in the pocket . . . cuts 'way down on costly hand-fitting . . . speeds up the assembly.

Yes! Make Every Move Count:

When you make every move count you accomplish all this and much more. TMI tested-quality tubing components make an important contribution to the performance record of your product . . . be it a space-bound satellite, an aviation giant . . . a nuclear world-traveler, down-to-earth household appliance or industrial equipment on a 'round the clock, 'round the year production schedule.

Stainless and special alloys .050" to 1.250" O.D. drawn as close as .0005"

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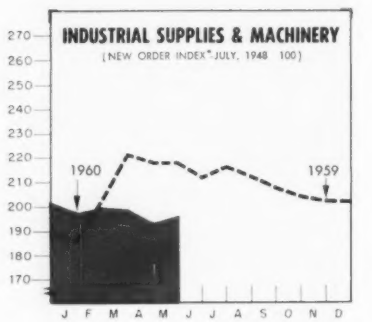
BRIDGEPORT (Montgomery County), PA.
The Mark of Quality TMI

THE BUSINESS TREND

	New Orders* 1960	New Orders* 1959	Sales* 1960	Sales* 1959
Jan.	14,190	13,900	15,450	13,541
Feb.	14,800	14,918	15,670	13,870
Mar.	14,640	15,323	15,170	14,400
Apr.	14,470	15,796	15,000	15,166
May	14,630†	15,241	15,090†	15,515
June	.....	16,133	.....	15,771
July	.....	15,493	.....	15,384
Aug.	.....	13,974	.....	14,008
Sept.	.....	14,747	.....	14,113
Oct.	.....	15,099	.....	14,047
Nov.	.....	13,721	.....	13,479
Dec.	.....	14,770	.....	15,010

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
Charts copyright, 1960, STEEL.



	1960	1959	1958	1957
Jan.	198	186	163	221
Feb.	200	202	157	219
Mar.	199	221	149	210
Apr.	194	218	148	203
May	196	218	152	199
June	...	212	164	199
July	...	216	170	197
Aug.	...	212	172	197
Sept.	...	207	178	203
Oct.	...	204	187	192
Nov.	...	202	189	180
Dec.	...	202	190	167

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.

year-to-year gains for department stores sales will not be out of the ordinary until later in the year because it took considerable time for the steel shutdown to show up in that part of the economy.

And when the data are in for the week ended July 16, the industrial production index will be above the year-ago position for the first time in more than three months.

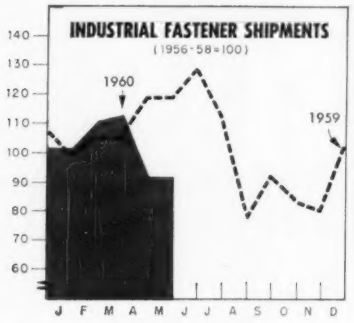
• **Psychological Boost**—Although statistics will be in favor of 1960 for the next few months, nothing basic has changed in this year's economy. The big change was last year. Yet it is a good bet that a lot of the gloom will begin to lift before too long. Exposure to the "right" kind of comparisons could add a psychological plus to the business picture.

Still Room for Expansion

And right now, businessmen are looking for a few plusses as they view an uncertain second half. The traditional forecasting barometers indicate caution for the immediate future, declares James M. Dawson, vice president and economist of the National City Bank of Cleveland. But like many economists, he is not convinced that the barometers are infallible. "A good case can be made for a gradual rise in over-all business activity well into 1961. Perhaps the barometers are merely reflecting the lull that now is underway and are saying the coming upturn will be modest rather than dramatic. Perhaps we are in a rolling adjustment or a straight-line recession such as in 1956 and the first half of 1957."

Says Morgan Guaranty Trust Co. of New York: "The favorable production experience (of the first half) provides tentative hope that the brunt of the sharp inventory adjustment has already been felt. If that proves to be the case, the outlook is for at least a gentle rise in industrial production in the months ahead and for a larger gain in gross national product during the third quarter than in the second, provided of course, that consumer spending, capital outlays, and overall government spending continue to rise. In all three of those areas, present tendencies generally point that way, even though rates of expansion are not sharp.

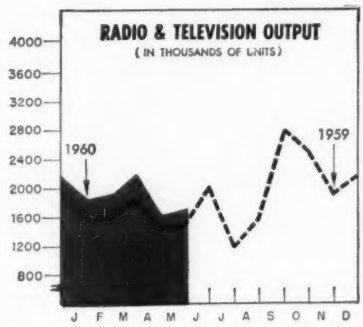
"Similarly, the fact that business conditions abroad . . . continue to be strong has favorable implications



(Seasonally adjusted)

	1960	1959	1958*	1957*
Jan.	102	99	133	173
Feb.	111	105	117	177
Mar.	103	105	103	166
Apr.	92	119	102	157
May	92	119	111	168
June	...	129	120	162
July	...	112	133	184
Aug.	...	77	120	155
Sept.	...	92	141	159
Oct.	...	83	137	163
Nov.	...	80	134	147
Dec.	...	102	152	140
Avg	...	101	125	162

*1947-49=100.
Industrial Fasteners Institute.



	Radio		Television	
	1960	1959	1960	1959
Jan.	1,356	1,125	526	437
Feb.	1,442	1,125	503	460
Mar.	1,668	1,348	550	494
Apr.	1,230	1,040	423	389
May	1,277	1,040	442	432
June	....	1,430	...	571
July	....	829	...	350
Aug.	....	1,009	...	547
Sept.	....	1,981	...	808
Oct.	....	1,796	...	707
Nov.	....	1,346	...	561
Dec.	....	1,553	...	593
Totals	....	15,622	...	6,349

Electronic Industries Association.

for U. S. exports . . . The reduction in interest rates, together with the increase in funds which has been provided by the Federal Reserve, may also produce a stronger pattern in home building than prevailed in the first half of the year.

"The expectation that over-all business activity probably will show some further advance through the third quarter cannot be projected with equal confidence beyond that period."

The Federal Reserve Bank of New York agrees that "while the current crop of indicators has yielded signs of both strength and weakness, the outlook remains favorable for some further expansion of economic activity."

Index Will Rebound

The king-size dip in STEEL's industrial production index during the two latest weeks of record represents the most drastic Fourth of July decline in the eight years in which the 1947-49 base period has been used. The preliminary 132 mark is also the lowest point since the last week of the 1959 steel strike. And, as in the case of that previous low, the steel industry is the main factor in the current situation.

Since the last full week in June, the deterioration in steel production has taken more than 11 points away from the index. However, the trend apparently has been reversed following the July 4 holiday, and from now until the end of the year, the situation should be one of general strengthening. After operations hit a low of about 42 per cent of capacity during the week ended July 10, the industry shoved its schedules up to about 53 per cent of capacity, roughly where they were prior to the holiday.

If the gradual improvement anticipated in steel materializes, STEEL's index should do no worse than hold its own over the rest of the summer and then move upward in the fall. The biggest depressant affecting the trend line in the immediate future is the model changeover period in motordom. Last week, some Valiant operations joined Imperial lines as Chrysler Corp. led the way. This week, De Soto is phasing out, and Plymouth, Dodge Dart, and Chrysler will follow suit.

However, steady to rising railroad freight car shipments and a seasonal uptrend in electric output should counterbalance this weakness.

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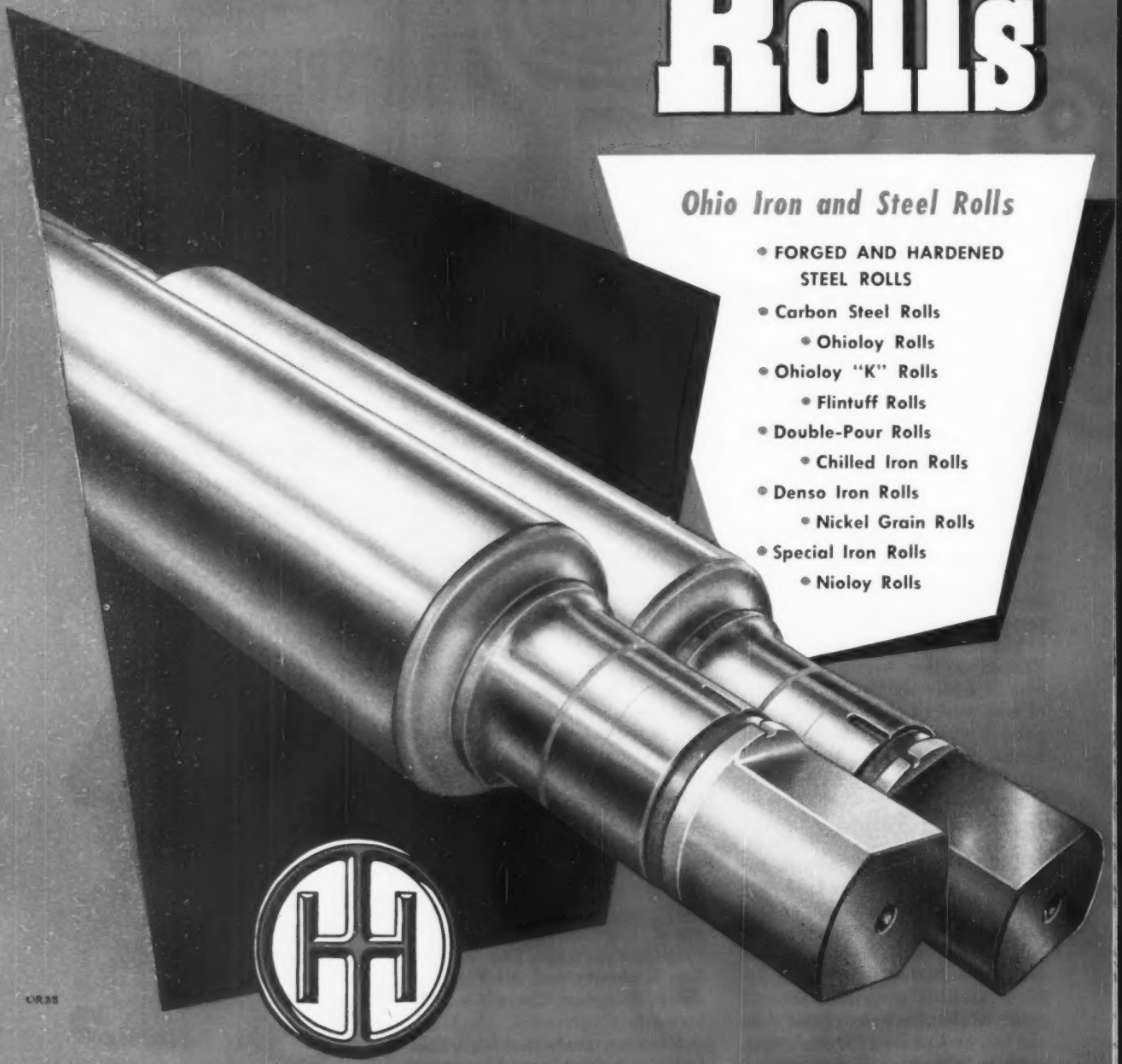
Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY



Ohio Iron and Steel Rolls

- FORGED AND HARDENED STEEL ROLLS
- Carbon Steel Rolls
  - Ohioloy Rolls
- Ohioloy "K" Rolls
  - Flintuff Rolls
- Double-Pour Rolls
  - Chilled Iron Rolls
- Denso Iron Rolls
  - Nickel Grain Rolls
- Special Iron Rolls
  - Nioloy Rolls

THE OHIO STEEL FOUNDRY CO., LIMA, OHIO

PLANTS AT LIMA AND SPRINGFIELD, OHIO... *Virtually at the center of the steel industry*

JAMES F. CONNAUGHTON
Bell Intercontinental pres.

R. G. SCHNEIDER
LeBlond engine lathe sales

CARL R. ROEHRER
Euclid Electric sales mgr.

VICTOR C. LAWRENCE
A. M. Byers gen. sales mgr.

James F. Connaughton was named president and chief executive officer of **Bell Intercontinental Corp.**, formerly known as Bell Aircraft Corp., Buffalo, until sale of its defense subsidiaries to Textron Inc. July 1. **Adm. Robert B. Carney** (USN, ret.) was elected chairman. Mr. Connaughton was president of Bell Aircraft's subsidiary, Wheelabrator Corp., and since last January, by special arrangement with Bell, also has served as president and chief executive officer of Sterling Precision Corp.

William B. Shellenberger was made manager of a new planning and procurement department of **Brown Instruments Div.**, Minneapolis-Honeywell Regulator Co., Philadelphia.

Gale C. Wicks was named assistant to the president, **Thor Power Tool Co.**, Aurora, Ill. He is in charge of liaison with the firm's Drying Systems Div. in Chicago. **Clarence M. Wulf** was appointed purchasing agent, succeeding Mr. Wicks at the Aurora Works.

Charles F. Kalmbach, purchasing agent, was named to supervise purchasing of **E. F. Houghton & Co.**, Philadelphia. **Herbert B. Fox**, director of purchases, has retired.

Gus Hartman was made Pacific Coast sales manager by **Wheatland Tube Co.**, Philadelphia. He replaces **Charles W. Boyle**, retired.

D. R. Benedict was made purchasing agent of **Midland Screw Corp.**, Chicago.

R. G. Schneider was appointed manager of engine lathe sales, **R. K. LeBlond Machine Tool Co.**, Cincinnati. He was field sales and engineering manager for J. H. Elliott Co. **Richard L. Fuller** was appointed a sales engineer, Philadelphia area.

Carl R. Roehrer was named sales manager, **Euclid Electric & Mfg. Co.**, Cleveland. He was manager of application engineering, and is replaced by **William E. Feil.**

Perry R. Roehm was appointed vice president of **Barden Corp.**, Danbury, Conn., to assist the president in general management. He was vice president-sales of Barden before leaving in 1955 to become vice president of Norden-Ketay Corp., and later president of that company. In 1958, he joined International Telephone & Telegraph Corp. as director of marketing. In 1959, he became president of its subsidiary, Intelex Systems Inc.

Fred B. O'Mara was named vice president-production, **National Carbon Co.**, division of Union Carbide Corp., New York. Mr. O'Mara was director of manufacturing.

Joseph E. Starich was made general manager, **General Drop Forge Corp.**, Buffalo, subsidiary of Dana Corp. He was general superintendent. **O. L. Giauque** was made plant manager of Dana's Auburn, Ind., Div. to succeed **Rene C. McPherson**, recently named executive vice president of Dana's Canadian subsidiary, Hayes Steel Products Ltd., Merritton, Ont.

Victor C. Lawrence was appointed general sales manager, **A. M. Byers Co.**, Pittsburgh. He formerly held positions as manager of the International Div. and manager, York Div. He more recently served the firm as a marketing consultant. **Richard I. Enzian** was named product manager-wrought iron; **Ralph E. Whittaker** product manager-steel.

Royal Little was elected president, **Textron Electronics Inc.**, Providence, R. I., to succeed **G. W. Miller**, who was promoted to president and chief administrative officer of Textron Inc., parent firm. **Joseph B. Collinson** was elected vice president-treasurer; **Charles K. Mills**, vice president and assistant to the president.

Joseph F. Degen was named vice president and general manager, **Daystrom Inc., Weston Instruments Div.**, Newark, N. J., and Poughkeepsie, N. Y. He is succeeded as vice president-operations, Weston Instruments, Newark, by **Edward L. Klein.**

Charles A. Porter was made chairman of **Republic Steel Corp.'s** company-wide blooming mill committee. He is presently superintendent of blooming mills at the Cleveland district steel plant. **Samuel J. Marcus** was named assistant sales manager, Cleveland district.

Albert C. Booth was made manager of **Ford Motor Co.'s** Indianapolis Steering Gear & Cold Heading plant, Transmission & Chassis Div. He succeeds **W. H. Smith**, reas-

G. A. SAAR

W. M. TERRY JR.

general managers at A-C Industrial Equipment Div.

WAYNE L. DOWDEY

DR. DON DAHLSTROM

Eimco Corp. vice presidents

signed to general headquarters in Dearborn, Mich.

G. A. Saar was made general manager, Mechanical Departments, and **W. M. Terry Jr.** general manager, Electrical Departments, Industrial Equipment Div., **Allis-Chalmers Mfg. Co.**, Milwaukee.

T. W. Nash was elected president, **L. W. Nash Co.**, East Palestine, Ohio. **L. W. Nash** was elected chairman; **R. U. Nash** executive vice president and treasurer.

William W. Wood Jr. succeeds **David D. Mason**, resigned, as president of **Link Div.**, General Precision Inc., Binghamton, N. Y.

Howard E. Robinson fills the new post of assistant to the president, **Jones & Laughlin Steel Corp.**, Pittsburgh. Last July, Mr. Robinson set up for J&L a Production Planning Programs Div. As director of that division, he co-ordinated production planning, order processing, and inventory control.

T. F. Olson was appointed financial vice president of **Eimco Corp.**, Salt Lake City, Utah. **Wayne L. Dowdey**, general sales manager, and **Dr. Don Dahlstrom**, director of the Palatine, Ill., research and development center, were elected vice presidents.

Elmer W. Broshot was made assistant sales manager, **Kerns United Corp.** (formerly L. R. Kerns Co.), Chicago.

Frank Blum was made manager of the Boston office of **Amco Div.**, American Metal Climax Inc., to succeed **Sheldon Tauben**, assigned new duties in the scrap buying field, Chicago office.

Milton H. Kemp, director of research, **Arno Adhesive Tapes Inc.**, Michigan City, Ind., was elected vice president of the company, subsidiary of Scholl Mfg. Co. Inc.

J. H. Harris was made administrative vice president of **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp. He was vice president and continues as treasurer.

Roy S. Jamison was made vice president of **Norwalk Powdered Metals Inc.**, Norwalk, Conn. He is in charge of manufacturing and engineering divisions.

Max R. Ahrens was made assistant manager of abrasion resistant alloy development of **Climax Molybdenum Co.**, New York. He was resident physical metallurgist in Climax, Colo. He is now in the Denver office.

Irving Whitehouse was made director of research for **Republic Steel Corp.**, Cleveland. Former assistant director of research, he succeeds the late **Earle C. Smith. John Hazel**, former chief ceramic engineer and head of the Ceramic Div. of the company's Research Center in Independence, Ohio, replaces Mr. Whitehouse.

John B. Wasson was made manager-expanded metal sales, Pacific

HOWARD E. ROBINSON

assistant to J&L pres.

MILTON H. KEMP

Arno Adhesive Tapes v. p.

J. H. HARRIS

Weirton adm. v. p.

IRVING WHITEHOUSE

Republic Steel research dir.

Got a severe WEAR problem?

Your answers are in this booklet

This new booklet is crammed with information on Carmet Cemented Carbides . . . man's hardest, most abrasion resistant metal . . . and on design techniques that make the most of Carmet's unique properties.

Properly designed, Carmet Cemented Carbides give outstanding service in applications involving severe wear and abuse. They possess an extraordinary combination of extreme hardness and strength, higher than any metal or alloy . . . cast, rolled or forged. They have three times the stiffness of steel . . . up to 100 times the abrasion resistance.

In Carmet's new booklet, the designer will find the charts, graphs, case histories, and tables of information needed for intelligent selection and application of the Carmet Cemented Carbides. And, there's a special section on design criteria for top performance. Ask your local Allegheny Ludlum representative for a copy, or write: ***Allegheny Ludlum, Carmet Division, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. S-7-3.***

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CHARLES N. HALL
Heald chief grinding eng.

ROBERT I. PETERS
Heil plant manager

LOUIS H. ARICSON
Daystrom v. p.-human relations

JOHN MIHALIC
Crosley Div. president

ROBERT L. JOHNSON
Hardinge Mfg. foundry mgr.

ROYDON S. PRATT
Bridgeport Brass research

Div., **Penn Metal Co. Inc.**, at Los Angeles.

John Mihalic, a vice president of Avco Corp. and president of its Nashville Div., was also named president of its **Crosley Div.**, Cincinnati. He succeeds the late **F. C. Reith.**

Robert L. Johnson was named foundry manager for **Hardinge Mfg. Co.**, York, Pa. He will direct activities of the Hardinge Meehanite and Ni-Hard foundry, where an expansion and modernizaton program is nearing completion.

Pennsalt Chemicals Corp. named **Douglas F. Woolley Jr.** manager of its newly created Eastern Seaboard region for the Corrosion Engineering Products Dept. He is in Philadelphia.

H. Frank Taylor was named manager of product planning for the Rectifier Components Product Section, Semiconductor Products Dept., Auburn, N. Y., **General Electric Co.**

Roydon S. Pratt, staff technical director, **Bridgeport Brass Co.**, Bridgeport, Conn., was named technical and research director. He assumes functions supervised by **Raymond A. Quadt,** former vice president-research and development, who was recently named president of Reactive Metals Inc. Mr. Quadt remains a vice president of Bridgeport Brass, which will manage Reactive Metals.

Milton C. Stafford was appointed manager-product sales, **Jones Machinery Div.**, Chicago, Hewitt-Robins Inc. He was Chicago district manager.

Peter W. Cummins was promoted to manager of product planning and market research at **Continental-Diamond Fibre Corp.**, Philadelphia, subsidiary of Budd Co.

James A. Shuttleworth was made New England district manager of a new sales territory of **Cambridge Wire Cloth Co.** Headquarters are at Stoneham, Mass.

Charles N. Hall was named chief grinding engineer for **Heald Machine Co.**, Worcester, Mass. He succeeds **Clifford G. Menard,** named consulting engineer for Engineering and Research Departments.

Robert I. Peters was named manager of the Rigidon plant of **Heil Process Equipment Corp.**, Cleveland. He was assistant chief engineer.

Louis H. Aricson was appointed vice president-human relations at **Daystrom Inc.**, Murray Hill, N. J., to succeed **L. E. Minkel,** who resigned to join Studebaker-Packard Corp. Mr. Aricson was vice president-general manager, Transicoil Div., Worcester, Pa.

Joseph B. Willmering was appointed assistant manager-oil country tubular products, **National Tube Div.**, U. S. Steel Corp., Pittsburgh.

Roy Omans was made assistant general sales manager, **Fabriform Metal Brazing,** Los Angeles.

E. K. Minear, purchasing agent and assistant to vice president-traffic, assumes additional duties as director of purchases in the Metal & Ore Dept., **American Zinc, Lead & Smelting Co.**, St. Louis. **John R. Englehorn,** former manager of the department, resigned. **B. J. Bowdon** was made assistant director of purchases of ore.

Robert E. Bockrath was named to a new group at **Dow Metal Products Co.**, division of Dow Chemical Co., Midland, Mich., responsible for developing aluminum and magnesium applications in the railroad industry.

OBITUARIES...

Angus G. Sturrock, chief metallurgist, **Wyckoff Steel Co.**, Pittsburgh, died July 1.

Nicholas L. Baker, district engineer in Detroit for **Niagara Blower Co.**, died July 5.

Raymond J. Kraemer, 64, senior vice president and director of purchases, **R. C. Mahon Co.**, Detroit, died June 30.

Francis C. Reith, 45, president, **Crosley Div.**, Avco Corp., Cincinnati, died July 2.

the SAGINAW b/b SCREW helps

Double Ditch Witch Sales in One Year!

"We've replaced an acme screw with a Saginaw Ball Bearing Screw to enable the digging boom of our Ditch Witch Trench Digging machine to be raised and lowered three times faster. It makes the operator's job twice as easy. And the Saginaw Screw saves us money both in first cost and greatly reduced maintenance. Since using the Saginaw Screw we've actually had to DOUBLE plant capacity to keep up with a two-fold increase in sales *this* year, and handle an expected increase of the same size *next* year!" *says Howard Worthington, Sales Manager, Charles Machine Works, Inc., Perry, Oklahoma.*

No wonder the Saginaw Screw adds a heap of *extra* Sales Appeal to the Ditch Witch! The Saginaw Ball Bearing Screw *converts rotary motion into linear motion with over 90% efficiency.* You, too, can save time, power, weight, space and cost by switching from outdated actuators to these versatile, always reliable Saginaw Screws.

Perhaps the Saginaw Screw can give *your* products that greater **S**ales **A**ppeal you're looking for. Interested in details? Write or telephone Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan —*world's largest producers of b/b screws and splines.*

The Saginaw b/b Screw adjusts digging depth of the Ditch Witch Trencher three times faster and twice as easily.

Give your products NEW SALES APPEAL... switch to the **Saginaw**

ball bearing screw

WORLD'S MOST EFFICIENT ACTUATION DEVICE

J&L Starts Operations at Ore Mine in Mesabi Range

SUPPLY OF Lake Superior iron ore has been augmented by the operation of a new Minnesota mine by Jones & Laughlin Steel Corp., Pittsburgh. The Lind-Greenway mine on the extreme west end of the Mesabi Range near Grand Rapids, Minn., is expected to produce about 700,000 gross tons of high grade beneficiated ore a year. That is about 10 per cent of J&L's current blast furnace requirements.

The high rate of production can be maintained for many years, says C. C. Henning, J&L's general manager of ore mines and quarries. The mine is being operated as part of the firm's Minnesota Ore Div. which also operates pits near the communities of Calumet, Hibbing, Virginia, and Gilbert, Minn. Harry F. Kullberg is manager of the division, headquartered at Virginia.

Operation of the mine is novel in that it consists of two separate open pits, one on each side of the Prairie River. The pits are connected by a truck haulage bridge.

The crude ore is mined by conventional power shovel methods and hauled by heavy duty trucks to a concentrator. It is washed before shipment. Ultimately, facilities for heavy media treatment will be added as leaner ores are encountered.

Shipment is by rail and ore boat to J&L's three steel producing plants—at Pittsburgh and Aliquippa, Pa., and Cleveland.

Gets Plate Mill Contract

Electric motor and control equipment for Alan Wood Steel Co.'s new 110 in. plate mill has been ordered from Westinghouse Electric Corp., Pittsburgh. The equipment will cost about $3 million and will drive the rolls of the mill which is being constructed near Conshohocken, Pa. It is slated for completion by July, 1961. Alan Wood will use the mill for rolling plates measuring up to 96 in. wide and 4 in. thick. The mill will consist of a scale breaker, a reversing mill, and a nonreversing mill.

Broadens Crane Line

Ohio Locomotive Crane Co., Bucyrus, Ohio, acquired the locomotive crane business of Wellman Engineering Co., Cleveland. The transaction involves the Wellman diesel electric locomotive crane and the former Browning mechanical locomotive crane which Wellman had manufactured since 1954.

Installs Straighteners

Two overhung roller straighteners have been installed at the South Works, South Chicago, Ill., U. S. Steel Corp. They will be used for straightening the wide variety of structural shapes produced in the plant's new structural steel mill. The nine roll machines were engineered and built by Birdsboro Corp., Birdsboro, Pa.

Kaiser Installs Equipment

Kaiser Aluminum & Chemical Corp., Oakland, Calif., is installing at its Mead, Wash., reduction plant a casting machine capable of producing 3600 lb of prime deoxidizing shot an hour. The unit is scheduled to be placed in operation about Aug. 1. Kaiser also is tripling production of superpurity aluminum at the plant with the installation of six additional refining cells. Each cell will have an annual rated capacity of 360,000 lb of aluminum with a guaranteed purity of 99.99 plus per cent.

Mitronics Buys Furnace

Mitronics Inc., Hillside, N. J., has installed a molybdenum rod, hydrogen furnace for the firing of metallized ceramics. The high temperature furnace will be used principally in the firing of metallic and ceramic members required in the manufacture of rectifier, diode, and transistor hermetic seals which must operate dependably at temperatures in excess of 1000° F. The unit was built by CM Mfg. & Machine Co., Bloomfield, N. J.

Kerrigan Iron Expands

Kerrigan Iron Works Co., a wholly owned subsidiary of Rockwell-Standard Corp., Coraopolis, Pa., is installing machinery and equipment for the manufacture of seamless, round tapered, aluminum lighting standards.

Enlarges Manganese Plant

Union Carbide Metals Co., a division of Union Carbide Corp., New York, installed additional cells at its Marietta, Ohio, plant, increasing Elmang electrolytic manganese production capacity by 20 per cent. The product contains a minimum of 99.9 per cent manganese metal in plate form about 1/8 in. thick.

Heald Machine Expands

Heald Machine Co., Worcester, Mass., is expanding facilities for assembly and testing numerically controlled machine tools. A special enclosed area, air conditioned and humidity controlled, has been built inside the Worcester plant for assembly and runoff testing of the machines. The area contains 2400 sq ft. Heald, a subsidiary of Cincinnati Milling Machine Co., Cincinnati, makes precision boring and grinding machines.

Plans Manganese Plant

Foote Mineral Co., Philadelphia, will build a $6 million electrolytic manganese facility at New Johnsonville, Tenn. Annual capacity: 20 million lb. The plant will be built in two stages and the first unit of 10 million lb capacity is expected to be on stream in late 1961 or early 1962. The firm expects to erect other manufacturing facilities at this site.

Melpar Builds Addition

Melpar Inc., Falls Church, Va., is constructing a $2.4 million, 120,000 sq ft addition to its plant. The electronics firm is a subsidiary of Westinghouse Air Brake Co., Pittsburgh.

CONSOLIDATIONS

McKay Machine Co., Youngstown, proposes to purchase **Federal Machine & Welder Co.**, Warren, Ohio. McKay builds coil handling and leveling equipment, forming machines, press feeding equipment, high speed equipment for pipe and tube mills, drawbenches, shear lines for cutting coils of steel to length, and other metalworking equipment. A sales agreement with Wean Equipment Corp., Cleveland, and a manufacturing-sales agreement with Mannesmann-Meer Inc., Youngstown, enables McKay to offer additional methods of pipe and tube making and other metalworking processes. Federal builds resistance welders, presses, and special metalworking equipment. An affiliate of Federal is Berkeley-Davis Inc. (fusion welding equipment), Danville, Ill. Affiliated with McKay are Vickers-McKay Ltd., England, and Wean-Damiron Co., France. Metal Processing Machine Co. (strip splicing equipment), Youngstown, is a wholly owned subsidiary of McKay.

Singer Mfg. Co., New York, purchased **Cobble Bros. Machinery Co. Inc.** and **Cobble Bros. Sales Co. Inc.**, Chattanooga, Tenn. Cobble will be operated as a subsidiary of Singer under the direction of the Special Products Div.

Narda Ultrasonics Corp., Westbury, N. Y., acquired **Clyde W. Briggs Inc.**, Freeport, N. Y., fabricator of sheet metal. Narda will operate the property as a division.

Gate City Steel Inc., Omaha, Nebr., purchased **L & S Steel Supply Co.** and **L & S Steel Works Inc.**, Columbus, Nebr. The property will be operated as a branch plant of Gate City Steel with L. L. Rowe plant manager. Gate City is a subsidiary of Husky Oil Co., Cody, Wyo.

Yuba Consolidated Industries Inc., San Francisco, purchased **K. W. Anderson Co.**, Tulsa, Okla., manufacturer of high temperature furnaces for processing industries. The property is being consolidated with Yuba's Petro-Chem Development Div. K. W. Anderson is vice president and general manager of the division. Yuba is reactivating its Richmond, Calif., steel fabricating plant.

Henry G. Thompson & Son Co., New Haven, Conn., is purchasing **Marshall Steel Co.**, McCook, Ill., manufacturer of precision ground tool steel and drill rods. Alan C. Henderson is vice president and general manager of Marshall Steel.

NEW PLANTS

Hercules Powder Co., Wilmington, Del., is building a plant for the manufacture of commercial explosives at Gilbert, Minn. Joseph E. Wommack Jr. is superintendent of the Gilbert plant. The facility will produce explosives designed for use on the Mesabi iron range, including a new type especially suited to blasting taconite and other hard rock formations.

Vickers Inc., Detroit, a division of Sperry Rand Corp., has established an additional manufacturing facility in Waterbury, Conn. The plant is designed for manufacturing standard hydraulic cylinders for the industrial, marine, and ordnance fields. Fred Tabshey is plant manager.

Computer Systems Inc. has moved into its new 30,000 sq ft plant at Culver Rd., Monmouth Junction, N. J. The plant will house laboratory, engineering, production, and administration facilities.

NEW ADDRESSES

Southern Electric Inc. and its division, **Ajax-Consolidated Co.**, moved their general offices to 8701 S. Greenwood Ave., Chicago 19, Ill.

Bee Chemical Co. moved to a new plant at 2700 E. 170th St., Lansing, Ill. The 28,000 sq ft building houses administrative and sales offices and research and manufacturing facilities. The firm makes coatings and plastisols.

Bristol Co., Waterbury, Conn., moved its New Jersey branch office to 420 Morris Ave., Springfield, N. J. Branch manager is J. F. Peterson.

Lithium Corp. of America Inc. transferred its executive and sales offices from Minneapolis to 500 Fifth Ave., New York 36, N. Y. The firm's technical service has been relocated at Bessemer City, N. C., the recently established site for its production facilities. Research and development laboratories are being moved to Bessemer City.

Sterling Transformer Corp. moved to a new plant at 510 Driggs Ave., Brooklyn, N. Y., tripling its plant area and production facilities.

ASSOCIATIONS

Alloy Casting Institute, Mineola, N. Y., elected these officers: President, J. D. Hagans, Ohio Steel Foundry Co., Springfield, Ohio; vice president, J. S. Wooters, General Alloys Co., Boston; and executive vice president and treasurer, E. A. Schoefer.

Resistance Welding Alloy Association, Philadelphia, elected these officers: President, H. A. Mullen, Ampco Metal Inc., Milwaukee; and vice president, R. H. Imes, Mallory Metallurgical Co., a division of P. R. Mallory & Co. Inc., Indianapolis.

Strategic Industries Association, Los Angeles, elected these officers: President, Harvey Riggs, International Electronic Research Corp., Burbank, Calif.; first vice president, R. R. Lent, Riggs Nucleonics Corp., Burbank; second vice president, W. P. Patterson, United Electrodynamics, Pasadena, Calif.; secretary, Jack Wilcox, Beattie-Coleman Inc., Anaheim, Calif.; assistant secretary, K. V. Hackman, Southwest Products Co., Monrovia, Calif.; treasurer, Gordon Jenkins, Anadite Inc., South Gate, Calif.; and assistant treasurer, Duane Denny, Automation Industries Inc., Cockeysville, Md.

Joseph Gilbert has been named secretary and general manager of the **Society of Automotive Engineers Inc.**, New York.

Charles F. Larson Jr. has been named secretary of the **Welding Research Council** of the **Engineering Foundation**, New York.

Tony Kueber knows how

Tony Kueber, President of Steel Warehousing, has good reason to be proud of the company's growth in stainless steel sales and reputation to service every stainless order that comes along. Under his leadership, the people who work with him have made a habit of prompt service. A fine example of intelligent management, Tony counsels salesmen, inspects the shop on occasion and never hesitates to pick up a ringing phone to take an order for stainless steel. His foresight has meant modern warehousing practices.

Although their average order is about 1,000 pounds, Steel Warehousing is equipped and willing to handle orders of any size. All orders are processed by a streamlined paper system. The service is fast . . . they often ship orders the same day, and they have as many as 20 trucks

to move stainless steel

in operation during peak periods.

Steel Warehousing's plant equipment is outstanding . . . the stainless steel plate flame and heli-arc cutting operation has been described as tops in the entire Midwest. They have metallurgists and engineers available for consultation. They also have extensive testing equipment. Small wonder they've increased stainless steel sales every year since they began to stock it.

Beloit Iron Works, Beloit, Wisconsin, is one of Steel Warehousing's many satisfied stainless customers. Beloit Iron Works buys stainless steel to make processing equipment for the pulp and paper industry. For example, they buy Type 304 stainless plate to make suction boxes that remove moisture from wet pulp and come in contact with highly corrosive chlorates, chlorites, sulfates and sulfites. That's why Beloit Iron Works makes the suction boxes of stainless steel. It's a clean material, strong and highly corrosion resistant. Stainless will keep the boxes performing for years and avoid corrosion failure that could cause shutdowns costing thousands of dollars per hour. Beloit Iron Works knows that stainless can be fabricated with normal care. They take their time in cutting, shaping and welding the stainless steel parts. The results are excellent.

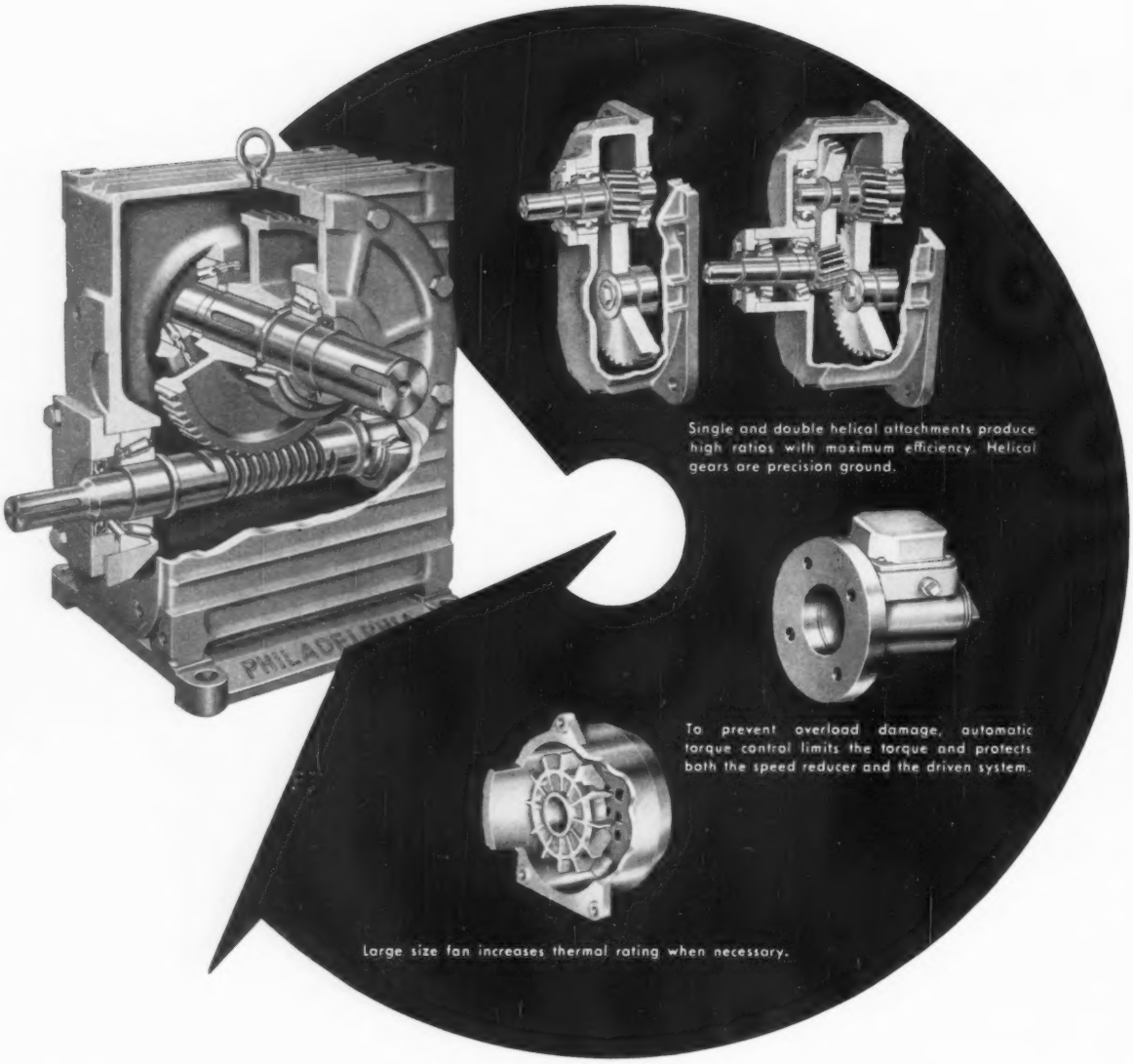
It pays to use the right material from the start. Stainless Steel has a reputation for costing less in the long run because of its unmatched combination of strength, corrosion resistance and high temperature properties. *USS is a registered trademark*

Steel

This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

Want higher worm gear efficiency?


Single and double helical attachments produce high ratios with maximum efficiency. Helical gears are precision ground.
To prevent overload damage, automatic torque control limits the torque and protects both the speed reducer and the driven system.
Large size fan increases thermal rating when necessary.

THEN HERE IT IS... FROM PHILADELPHIA

Here's new high efficiency in heavy duty worm gear drives that has never been available before. Helical attachments for double and triple reduction units combine the efficiency advantage of helical gearing with the high ratio advantage of worm gearing. You save on power... operating temperatures are lower... gearing lasts longer.

New high capacity, too. Improved tooth forms, precision ground alloy steel worms, special high strength bronze gears, heavy duty housings, precision ground helical gearing ... all add up to higher capacity in less space. In many instances you can save up to 50% in space, 40% in weight.

Delivery from stock of any drive arrangement and any mounting arrangement. Ratios from 5⅓:1 to 6150:1. Center distances: 3 in. to 21 in. Torque control attachments are also available from stock. For complete data, write for catalog WG-60.

philadelphia gear drives

PHILADELPHIA GEAR CORPORATION

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INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

Technical Outlook

ATOM AGE TESTER—Both quantitative and qualitative evaluations of alloy components can be made by irradiating the sample with neutrons, measuring the radiation resulting. It's not quite a shop method—operator shielding is necessary, the equipment is costly, and interpretation of the results takes training and experience—but it is another way of studying metals, and it is nondestructive. A unit has been developed which bombards one hydrogen isotope with another; the result is helium and the neutrons are used for activation.

BREEDS BETTER BERYLLIUM—Electrolytic refining of beryllium offers a means of purifying scrap, may help produce high purity metal. It's been done in a fused salt cell at the Boulder City, Nev., metallurgical research lab of the Bureau of Mines. The cell is the same type used for electrorefining of titanium, will be tried on other metals. Purity reported: At least 99.5 per cent.

COLORED CASTINGS—Better physical properties in color anodized diecastings, using a new alloy and a vacuum process, have been reported. Elongation values of 5 to 7 per cent, tensile values equivalent to usual diecasting alloys are claimed. Finishes can be bright, semigloss, or satin. Also involved are modifications to the anodizing process, says Hamilton Die Cast Inc., Hamilton, Ohio. Other alloys, developed for the casting equipment, can be brazed, welded, or coated with porcelain enamel, the company states.

WATCH THOSE IONS— Close control of the chloride ion concentration is one of the keys to successful operation of a method for electroplating aluminum with nickel, says James T. N. Atkinson in *Plating*. The solution is close to being corrosive to the aluminum, eliminates the surface oxide layer which interferes with plating. No zincate treatment is required, anode and cathode efficiencies are near 100 per cent, and it is even possible to plate on alloys high in silicon, the report states.

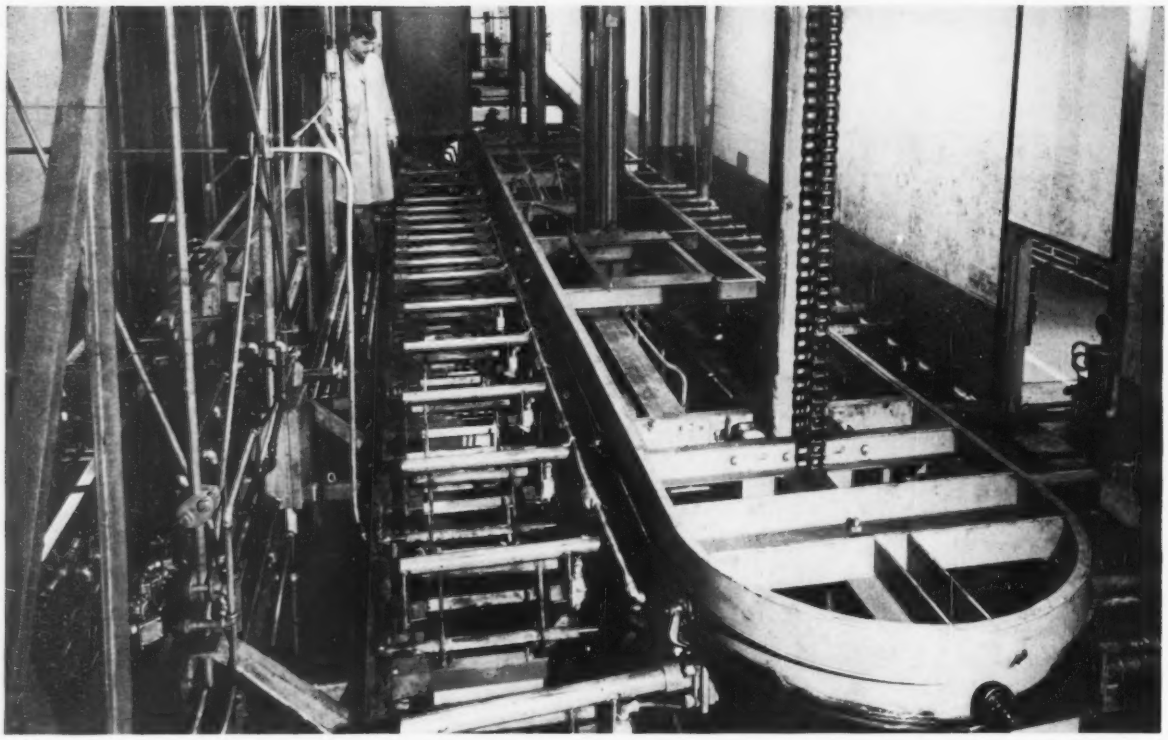
SQUEEZE PLAY— Although lubricating films aid forming and keep motors running, they can cause surface roughness during plastic working of metals, reports L. H. Butler, University College, Cardiff, Wales. He believes a lubricant film prevents the metal from conforming with die surfaces. Size and distribution of roughness suggest that original grain size of the metal influences final finish.

FORGING DIE STUDY— Detroit sources report that General Motors is comparing cast steel forging dies with those made by electrical discharge machining. A year or two from now, the corporation is expected to adopt the better method.

MICA PAPER— Tiny flakes of synthetic mica are said to be superior to natural mica in forming paper-thin sheets for electronic uses, claims the Department of the Interior, Washington. The development stems from attempts to free the U. S. from dependence on foreign high grade mica.

HEFTY PATENT— The gadget that computes direct dialing phone charges required a patent that weighed almost 11 lb, reports Bell Telephone Laboratories, Murray Hill, N. J. The assembly-computer required 266 pages and 354 sheets of drawings to describe the claim.

AUTOCHECKS CASTING QUALITY—Casting machines for Corvair cam gears and oil filter adapters are equipped with a red light which can be turned on by the quality laboratory if a defective part is found during selective fluoroscope and x-ray checks. Parts from that machine are then checked 100 per cent until the trouble is cleared, says the General Motors division.



This hydraulically operated machine carries railway bearing components through a 33 cycle phosphating process. Drawing on opposite page shows sequence of operations

Automated Line Phosphates Bearings

CORROSION PROTECTION for tapered roller bearings used in railway equipment is provided by an automated phosphating setup at the Columbus, Ohio, plant of the Timken Roller Bearing Co.

The phosphating system, which cost $64,000, processes 160,000 of the big bearings a year. It was designed by Timken engineering personnel and built by Detrex Corp., Detroit.

Similar equipment will soon be in operation on a second railway bearing line under construction at the Columbus plant.

• Parts pass through the phosphating system on racks that hang from an overhead conveyor.

Each of the 33 racks carries a cup, two cones, a cone backing ring, and an axle end cap through 33 machine cycles. Time per cycle: About 1½ minutes.

Machine motion is provided by hydraulic power and controlled by a series of electric limit switches and timers. In each cycle, the machine raises the carriers and moves them forward, disengages, backs up, and pushes the carriers forward in the processing tanks. Then it engages the carriers again to start a new cycle.

• After parts are loaded on conveyors, they are automatically carried into the degreasing and phosphating cycles.

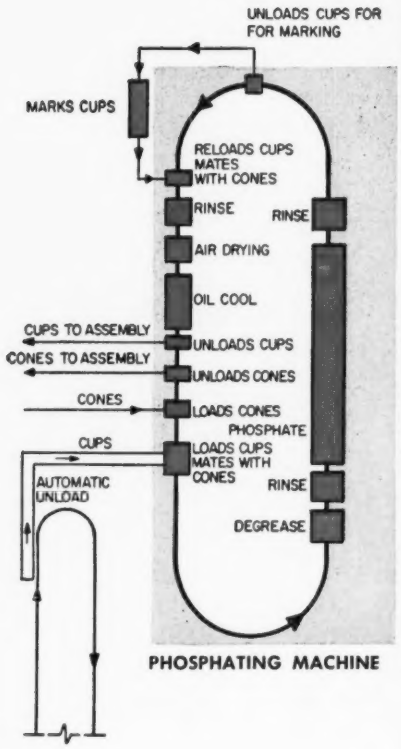
Cups from the grinding line are inspected, gaged, and etched with a serial number, then placed on an overhead conveyor, which loads them on phosphating racks. Cones are inspected and gaged (but not etched) and loaded on the racks by hand. Axle end caps and cone backing rings—purchased items—are also loaded manually.

The parts pass through a two cycle degreasing treatment in trichlorethylene. The solution is kept clean by distillation, and the bath temperature is maintained at 175° F.

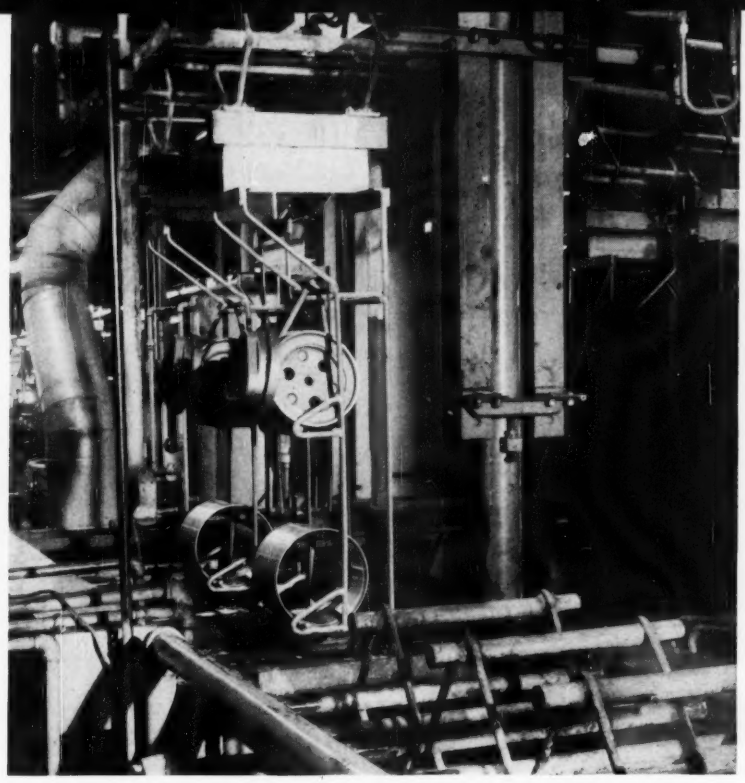
In the phosphating phase, which lasts 15 cycles, the components go through a solution of phosphating compound and water which is heated by two groups of electric coils. Timers switch the heating load from one set of coils to the other periodically. Rise and fall of coil temperature causes expansion and contraction, which flake off particles clinging to the coils. Thermostats maintain a solution temperature of 185° F.

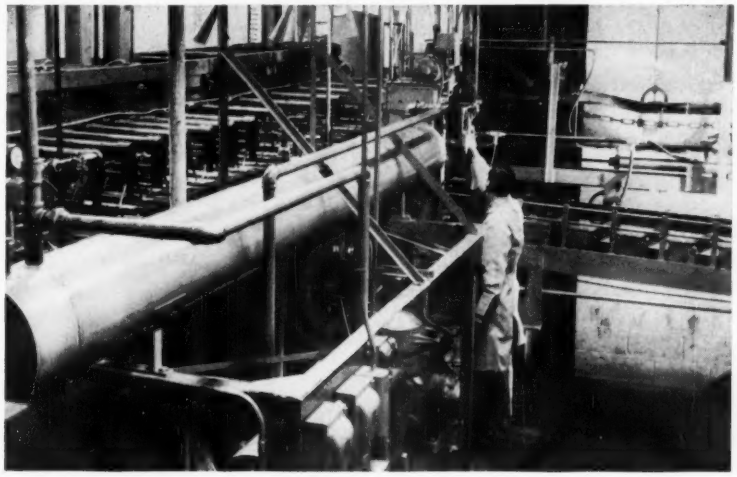
• Hot water rinses remove residual acid products from the parts.

Units coming from the phosphating tank pass through a rinse in water held at 200° F. Bearing



PHOSPHATING MACHINE


Conveyor transfers racks of bearing parts from the trichlorethylene degreasing solution to the phosphating tank (foreground)


Parts are cooled in an oil bath (left); temperature is controlled by a refrigerating unit, and a separator takes out water carryover

Racks of parts for railroad rolling stock are transferred from one phosphating tank to another by hydraulically operated machinery

cups are unloaded automatically and rolled over an ink die, which applies trademarks and other identification. The cups then rejoin their carriers.

A second hot water rinse removes any remaining acid products.

• Parts are air dried, oil cooled, and taken to assembly.

An air blast removes moisture left on the parts from the hot water rinse. Time required: One cycle.

Carriers then go into a mineral seal oil cooling process for seven cycles. That cools the parts to room temperature and permits lateral gaging before assembly.

The oil bath is held at room temperature by a refrigerating unit; a De Laval separator removes water carried over from the rinse.

Cups are automatically separated from the carriers and rolled down a chute to an elevator, which takes them to the assembly station. Other parts stay on the carriers, which are discharged onto a power-and-free conveyor that takes them to a manual unloading station.

• Bearing components are phosphated on all surfaces except the rollers and seal cases.

Protection from corrosion is an old problem to bearing users. An order of bearings may be used in a few weeks or, if they are replacements, they may be in storage for several years.

Stamped steel bearing cages and the bores of roll neck bearing cones have been phosphated for several years. Timken metallurgists suggested treating the cones to prevent scuffing and scoring of the roll necks. Results were satisfactory; present practice is to phosphate bores and bearing surfaces on all four row, roll neck bearings.

Truck Frame Fabrication Speeded by 200 ipm Welds

TWO, huge welding machines at A. O. Smith Corp.'s Automotive Div., Milwaukee, are welding truck frame assemblies at 200 ipm. Two men loading each welder can turn out about 85 assemblies an hour.

The two "monsters," as the men call them, are part of a line that was started in late 1959 to fabricate truck frames in two wheelbases. The division turns out frames for Chevrolet, GMC, and General Motors of Canada trucks on interchangeable facilities.

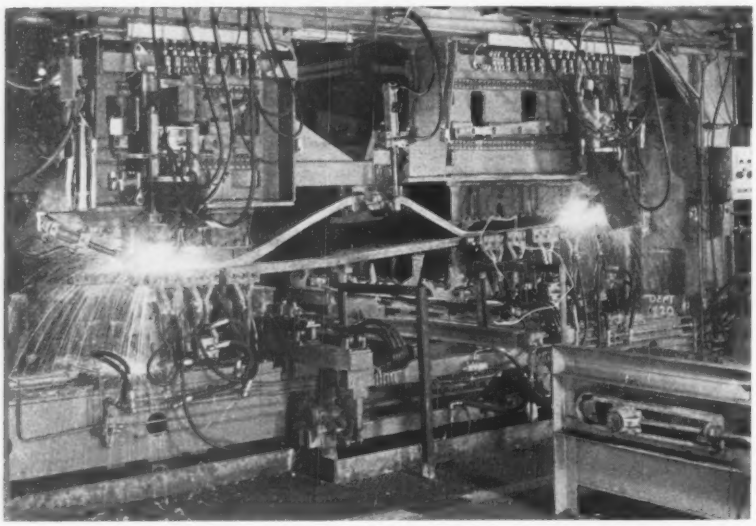
Each welding machine has four, automatically controlled, weld heads —two of which weld the 24 in. seams at the front inner rail to side bar and two of which weld the 48 in. seams at the rear inner rail to side bar. The four welds are made simultaneously with the heads traveling toward the center of the bar.

• **Uses Electronic Tracer**—A unique feature of the machines is the ability to maintain a constant arc in proper relation to the joint being welded.

The weld heads travel on vertical and horizontal cam tracks which are made to the drawing contour of the side bar. Variations in flange edges are sensed by an electronic tracing system, which makes corrections.

Any deviation of the arc from its proper weld position as it moves along the contoured bar creates a current unbalance which results in a variation in voltage between the parts being welded. The voltage variation is amplified and fed into the control system which automatically corrects the arc location through a servo controlled cylinder. In reality, the arc is constantly oscillating slightly, in response to correction signals.

The machines built by Banner Welder Inc., Milwaukee, use A. O. Smith, 600 ampere, constant potential CO-Matic welding heads (CO_2 shielded arc). They are operated at 29 volts, 550 amperes, and use 45 cu ft of gas an hour. CO_2 is piped to the machines via a header system from outside storage tanks.



Weld heads move toward the center of the truck frame assembly; hydraulic clamps hold the side bars and inner rails in position while they are joined

• **How Frames Are Made** — The frame assembly line is built in a Y shape. Right side bars and inner rails come down one side of the line; left side bars and inner rails come down the other.

Several piercing operations take place and certain flanges are hand welded before the parts reach the welding machines.

Side bars and inner rails are welded into subassemblies.

Then the right and left sides of the frame are welded into a single X-frame unit.

Front and rear suspension cross members are welded in place, and the assembly continues down the conveyor line, as various support members are added to make up the finished frame.

• **How the Welder Operates**—At the welding machine, two men on the preassembly station load a side bar and clamp it. (All clamps and machine movements are hydraulically controlled.) They load the front and rear inner rails and depress pushbuttons to partially depress the rails into the side bar.

Depressing pushbuttons to start the run cycle causes a walking beam transfer device to pick up the assembly and carry it about 3 ft to a dwell station. As soon as the assembly in the welding station has been completed, the walking beam picks up the one in the dwell station and carries it to the welding position.

Hydraulic cylinders clamp the part on all sides and at the ends, depressing the rails into the bar all the way and squaring up end flanges. Then the welding heads move down the bar, permanently joining the assembly.

• **Saves on Labor Costs**—A. O. Smith doesn't have a direct comparison of its machines with the alternative of hand welding because the line is new and hand welders have not been used to join the subassembly.

Cost would have been considerably higher by the hand welding method, since two men operate each machine. It would take at least four hand welders to do the job, possibly more because of the length of the welds. Production of 85 frames an hour would be hard to reach; 200 ipm would be unlikely.

Tool Builders May Sell More to Russia

Government decision to allow exports of some machine tools to Soviets could give some U. S. companies a chance at a new market at a time when they most need it

A DECISION to grant an export license to a U. S. builder of special machine tools for $5.3 million worth of transfer equipment (STEEL, July 11, p. 36) indicates that State and Commerce Department officials are willing to let more U. S. firms profit from Russia's nonmilitary growth.

The decision, coming in the backwash of the summit conference travesty, will surprise many industrialists.

• **How the Case Came Up**—Six months ago, Russian industrialists asked Cross Co., Detroit to bid on a line to process V-8 aluminum automotive engines. As conceived by the Russians, the line would consist of some integrated casting equipment plus milling, drilling, and boring stations. It also would perform some subassembly operations.

Cross then sought word from Washington on official policy before wasting time on the inquiry. The Commerce Department gave official sanction to the transaction and indicated an export license for the machine would be issued if the U. S. company got the order.

• **How It Stands**—More preliminary study will be necessary before the builder can decide whether to bid on the machine. He figures he'll be bidding against at least six or seven strong foreign competitors (in England and West Germany, perhaps also in Italy and France). The difference in building costs could keep him from being truly competitive even if he decides to try.

• **Should He Bid?**—Entirely aside from the engineering and competitive problems that will influence his decision, he is already aware of emotional pressures that will become part of the decision, or at least of a reaction to it.

If he bids, criticism of his company, and of the government, is likely to come from those who believe:

1. We should do no business with Russia now. A firmer stand by the U. S. in all of our dealings with that country could stem the onslaught of Communism.

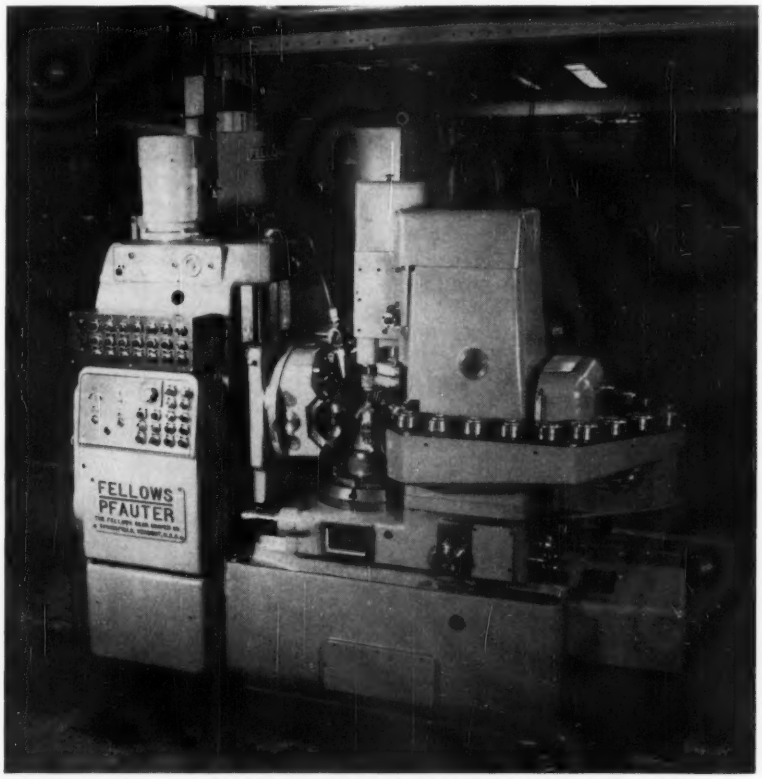
2. We must not furnish Russia with technical knowhow or capacity that she may not have since the resultant upgrading will be interpreted in the world as a gain for Communism.

If he bids, he'll be supported by those who believe:

1. Freer trade of nonstrategic products could help ease tensions, since "it's tough to go to war with someone you are doing business with."

2. Our refusal to participate will not affect Russia's ability to acquire both the knowhow (much of which she now has) or capacity, which will be bought abroad if not in this country.

3. An order for $5.3 million worth of machine tools at a time when the whole industry is becalmed is a most welcome sight, and some builders might decide it's well worth going after to protect a plant, payroll, and profit.



FIRST OF A NATURALIZED U. S. LINE, this Fellows-Pfauter gear hobbing machine was built at the Springfield, Vt., plant of Fellows Gear Shaper Co. It's the result of a license agreement between the U. S. builder and Herman Pfauter, Ludwigsburg, West Germany. The machine will be shown at The Machine Tool Exposition—1960

Product, Power Contracts Insure Business Stability

LONG TERM contracts for the purchase of electric power and marketing of semifinished aluminum are expected to stabilize operations at the St. Lawrence Reduction Plant of Reynolds Metals Co., Massena, N. Y.

About 19 million lb of aluminum were used in building the plant, which cost $88 million. It occupies a 1700 acre site on the St. Lawrence Seaway. Two of the plant's three potlines are in operation. Present complement of 500 workers is about 100 short of the plant's rated employment.

• Availability of electric power at attractive rates is an important factor in the plant's operation.

Hydroelectric power for the reduction lines is purchased from the New York State Power Authority under a 33 year contract at 4 mills per kwh. The company has contracted for 200,000 kw firm and 39,000 kw interruptible power. It also has a supplementary contract with Niagara Mohawk Corp.

Power comes into the plant as alternating current at 13,800 volts and is converted to direct current at 850 volts through a battery of 42 rectifiers. Individual pot voltage is 4.5 volts; that maintains a reduction temperature of 1800° F.

• A third of the aluminum output is delivered in the molten state to a foundry 1 mile away.

Rated capacity of the plant is 200 million lb of aluminum annually. A foundry operated by the Chevrolet Div. of General Motors Corp. is under contract to take 75 million lb a year under a ten year molten metal contract with Reynolds. Cost is 10 per cent less than when the aluminum is used in pig form, says Richard Walters, foundry manager.

The metal is trucked to the foundry in two, 9000 lb crucibles, lined with refractory brick and preheated to about 1600° F (see STEEL, June 27, p. 60).

It takes about 2 lb of bauxite to produce 1 lb of alumina, and 2 lb of alumina to make 1 lb of aluminum. Reynolds ships bauxite from Jamaica to Corpus Christi, Tex., where it is converted to alumina and shipped to Massena by rail. Monroe Wells, Reynolds vice president, says the company plans to construct docks at Massena, so it can transport alumina and finished aluminum via the Seaway.

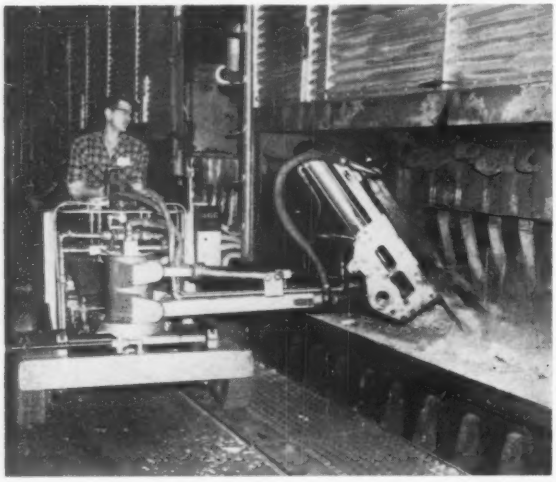
Reynolds has no high purity pots at Massena. Purity level of most of the Massena output is rated at 99.7 per cent. Metal not sold to Chevrolet in the molten state is poured into pigs, ingots, and bars for shipment to other Reynolds processing plants, or for sale to other users. Eight to 10 per cent of Reynolds' total domestic output of aluminum is exported to the company's foreign subsidiaries.

• Modern mechanical devices save time in the potrooms.

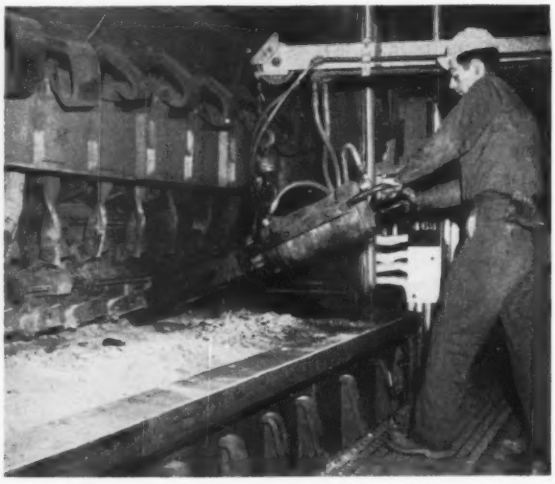
A hydraulically operated pot puncher breaks up crust formations on the top of each reduction pot. The device is operated by one man. Formerly, workers had to break up the crust by hand, using a long crowbar. "The pot puncher does in seconds what used to require 10 minutes of hard work," says Vernon G. Kneeskern, Massena plant manager.

Another time saver: A pin pusher, operated by one man, which inserts electrode contact pins.

The plant was started in 1957; the first line of Soderberg reduction pots was activated in July, 1959. The plant contains four holding furnaces of 700,000 lb capacity, and one of 50,000 lb.



Pot puncher breaks crust on the tops of reduction cells in seconds, saves 10 minutes of hard work on each pot



One man operates a pin pusher that inserts contact pins into electrodes; manual method required two men

Large Transformer Made of Aluminum

A PROTOTYPE, foil wound, aluminum power transformer will soon be installed at the Aluminum Co. of America's Massena, N. Y., fabricating works.

The stepdown unit, rated at 15,000 to 20,000 kva is built entirely from aluminum except for the core and a few mechanical accessories.

Constructing the unit presented a number of problems to the builder, the Power Transformer Dept., General Electric Co., Pittsfield, Mass.

Foremost was winding more than 5½ miles of aluminum foil for the three high voltage coils. That was solved by a team of GE and Alcoa engineers who designed a special machine for winding the foil for each phase.

• **Job for Ultrasonics** — Another problem required considerable experimentation into the specialized techniques of ultrasonic welding. A process was developed for firmly welding transformer tap connections to the aluminum foil.

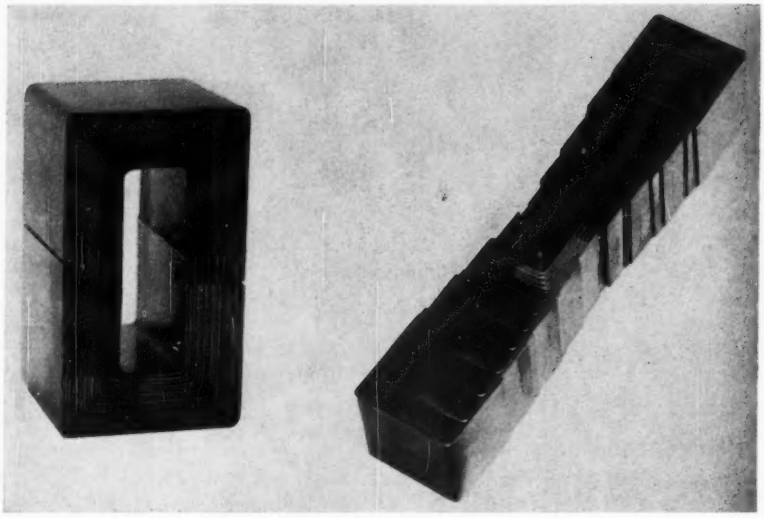
N. E. Dillow, manager of marketing for the GE department, said that the physical orientation of the conductor with respect to the kraft paper insulation provided transformer coils with greatly improved transient voltage characteristics. He reported that the unit passed all standard factory tests prior to shipment and said that with respect to operating temperature, the unit performed exceptionally well.

Tap Water Cools Bus Bar

Using tap water to cool an isolated-phase generator bus is contributing to space saving, reports the Delta-Star Electric Div. of H. K. Porter Company Inc., Chicago.

In testing the unit, water was recirculated through the bus at different temperatures and rates of flow. The circulating water was cooled in a refrigerator unit. It was possible to use tap water because the voltage was low.

The 19 in. diameter bus is made of aluminum and is enclosed in a 40 in. aluminum duct.



Interleaved, nested, U-shaped laminations form the core of a new, lighter, and smaller electrical transformer

Core Design Permits Smaller Transformers

A NOVEL IDEA in core design is reducing transformer weight and size from 2 to 30 per cent, reports the developer, Sylvania Electric Products Inc., a subsidiary of General Telephone & Electronics Corp., New York.

The smaller transformer will permit the design of more compact electrical and electronic equipment.

The Flexi-core, as it is called, consists of matching sets of U-shaped laminations of silicon steel. Individual strips making up the set are graduated in size. One leg of the strip is shorter than the other. When stacked, the staggered lengths result in alternate spacing between the strips. On fitting the halves together, the parts mesh in tongue and groove fashion to form a hollow rectangle, square, or other desired shape.

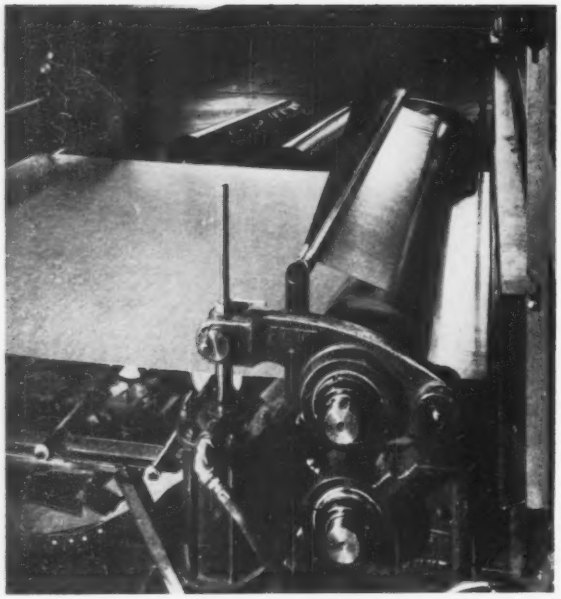
By using nested cores, magnetic lines of force can flow continuously with the grain of the steel, explains O. Howard Biggs, vice president-research and engineering. That reduces the resistance of the magnetic circuit and permits the Flexi-core transformer to operate as efficiently as a conventional transformer that has a larger and heavier core.

The U-shaped cores can be combined to make a shell type transformer, replacing E and I sections.

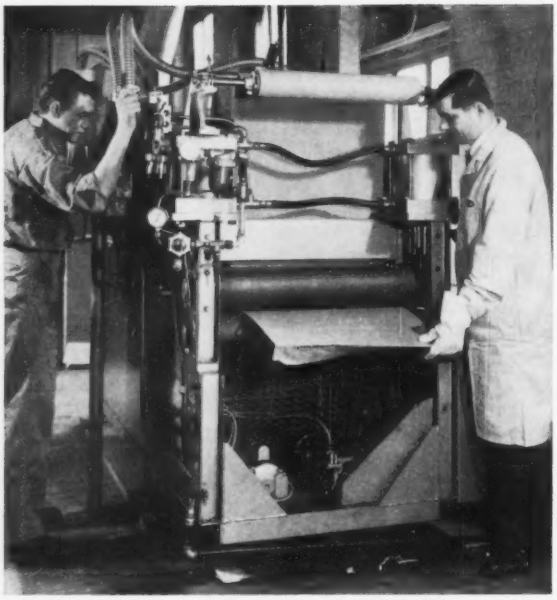
• **Other advantages attributed to the design include design flexibility and lower tooling costs.**

Conventional transformers are mass produced and are regarded as shelf items. When they are used, Sylvania points out, an electric equipment builder must restrict his design to suit available standard sizes; he is penalized with retooling costs if he specifies an odd size or shape; and, since a transformer can be the largest component in his product, he generally must compromise his design.

The new cores can be machined in a wide variety of shapes and sizes without tools or dies. Sylvania claims that with its equipment it can build transformers in any size or shape up to 18 x 18 x 36 in. The new development will permit the engineer to design a transformer for the job rather than fit the job to the transformer, it says.



Closeup of the laminating production line shows vinyl, fed from an overhead roll, being applied to the cleaned, Bonderized, and adhesive-coated metal



This is the pilot laminating line used by Clad-Rex researchers to produce a variety of laminates for testing. The line simulates production conditions

Improved Vinyl-Metal Laminate Opens New Design Possibilities

Fabricator develops system that licks problems of delamination on severe draws and at elevated temperatures

THREE YEARS of research at the Chicago laboratories of Simoniz Co. have gone into conquering forming and heat problems that have limited the use of conventional vinyl-metal laminates.

Now, Dr. Paul Wenas, vice president-technical research, says his team has developed a laminate that can be worked with conventional metal forming equipment to severe configurations, and can be exposed to elevated temperatures. On conventional laminates, he says, the vinyl will pull away from the metal on severe draws and at elevated temperatures.

The new product, Clad-Rex 102, is fabricated at the Clad-Rex Div. of Simoniz, also in Chicago.

• **Extends Drawing Ratio** — The laminate can be drawn to depths up to nine times the corner radius. Normally, a deep drawing, special kill, 24 gage steel will fracture beyond a 6:1 ratio. Dr. Wenas says the vinyl surface seems to enhance the forming and drawing characteristics of sheet metal. It becomes a lubricant that permits better flow of metal, and often will eliminate tearing and wrinkling of the metal in complex draws.

After drawing, Clad-Rex 102 can be pinch trimmed or model trimmed without adverse effect on the vinyl.

• **Withstands 200° F**—Drawn and trimmed laminate can be exposed to elevated temperatures for extended periods without previous postcuring or annealing between forming and trimming. Standard test is 200° F for 4 hours.

Formed parts of Clad-Rex 102 (6:1 draw) have been subjected to cycling tests which call for exposure to 100 per cent relative humidity at 100° F for 24 hours, then immediately placing the part at −70° F for 4 hours, then at 160° F for 16 hours, and then in a Weatherometer for 4 hours. After 20 such cycles, the formed parts showed no signs of cracking, crazing, or delamination.

• **No Property Change** — Larry Dwyer, vice president - sales for Clad-Rex, says the 102 laminate has the same physical and mechanical properties as the conventional Clad-Rex laminate, and is available in the same number of styles, colors, and textures.

The addition of the 102 line, he explains, allows the division to supply the fabricator and customer with a wide spectrum of laminates which will fit most requirements, and which can be handled, formed, and trimmed on conventional dies and equipment without special handling or special equipment.

40-ton Plymouth M-Series Locomotive switches boxcars for Andersen Corp., Minnesota building products manufacturer whose annual production fills about 2700 cars.

"Handles 7 times the load of our former unit"

In the words of T. H. Fredrickson, Plant Engineer for Andersen Corp., Bayport, Minnesota: "Our Plymouth has proven to be an extremely durable piece of equipment—with the reserve power and positive braking action to perform our job efficiently and economically. It moves 7 times the load hauled by our former 10-ton locomotive, resulting in considerable savings to us in material handling costs. We would not be able to handle our present yard traffic without it."

The 40-ton gasoline-powered Plymouth Model "M" is equipped with Torqomotive drive. Used for switching freight cars in the plant rail yard, it works 30 to 35 hours a week, hauls 15 loaded boxcars or 20 empties over a 3-mile stretch of track with grades ranging up to 3%.

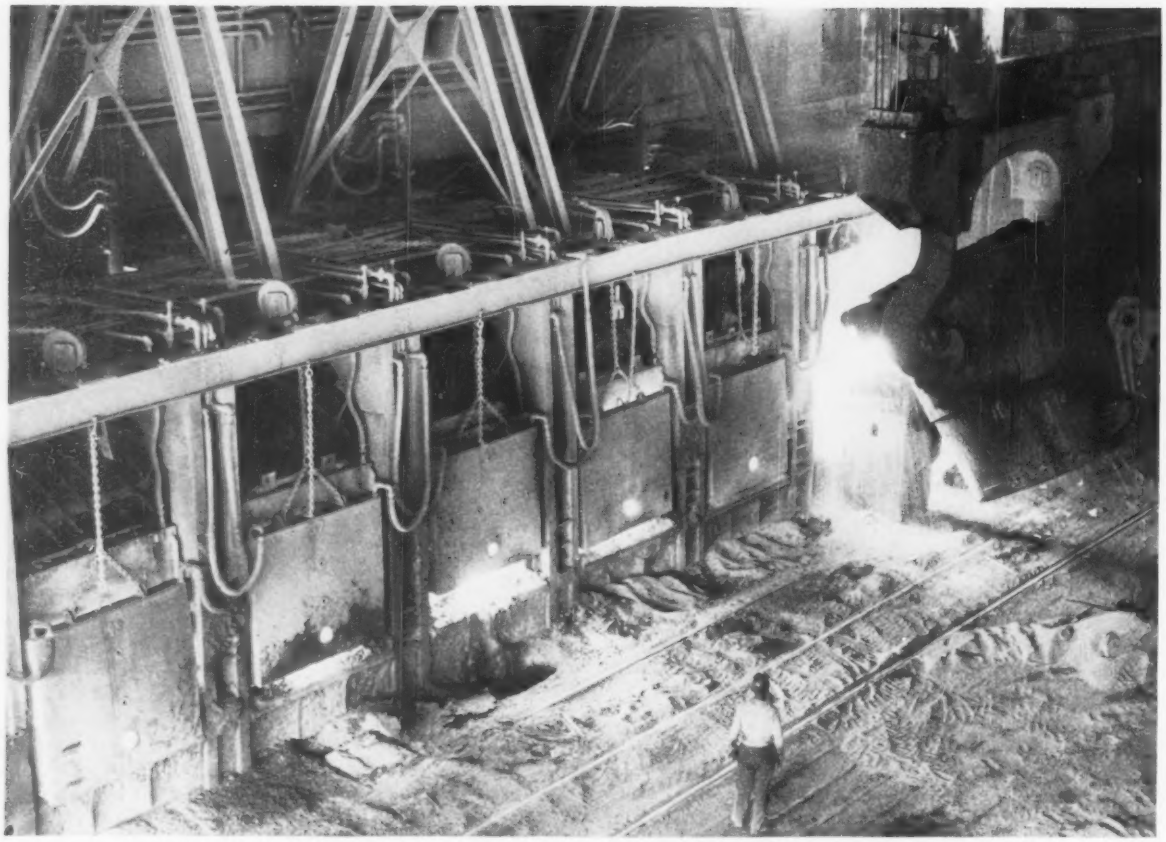
For full information on a Plymouth designed to fit **your haulage needs,** send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-1, Plymouth, Ohio.

RAIL POWER

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world



Semirefined steel from bessemer converters is charged into Weirton Steel's No. 14 open hearth. Oxygen is introduced through roof lances to decarbonize the heat

Oxygen Boost to Increase Steel Output

All four of Weirton's blast furnaces will be operated on enriched air; oxygen will be used for flame enrichment and decarbonization in all the company's open hearths

EXPANSION of oxygen producing facilities will make more than twice as much of the gas available for blast furnaces and open hearths at Weirton Steel Co., Weirton, W. Va., a division of National Steel Corp.

Additional storage and a new, 600-ton-a-day generating plant—to be built and operated by Air Products Inc., Allentown, Pa.—will boost over-all oxygen output to 1100 tons a day.

• Old and new oxygen storage facilities will be combined.

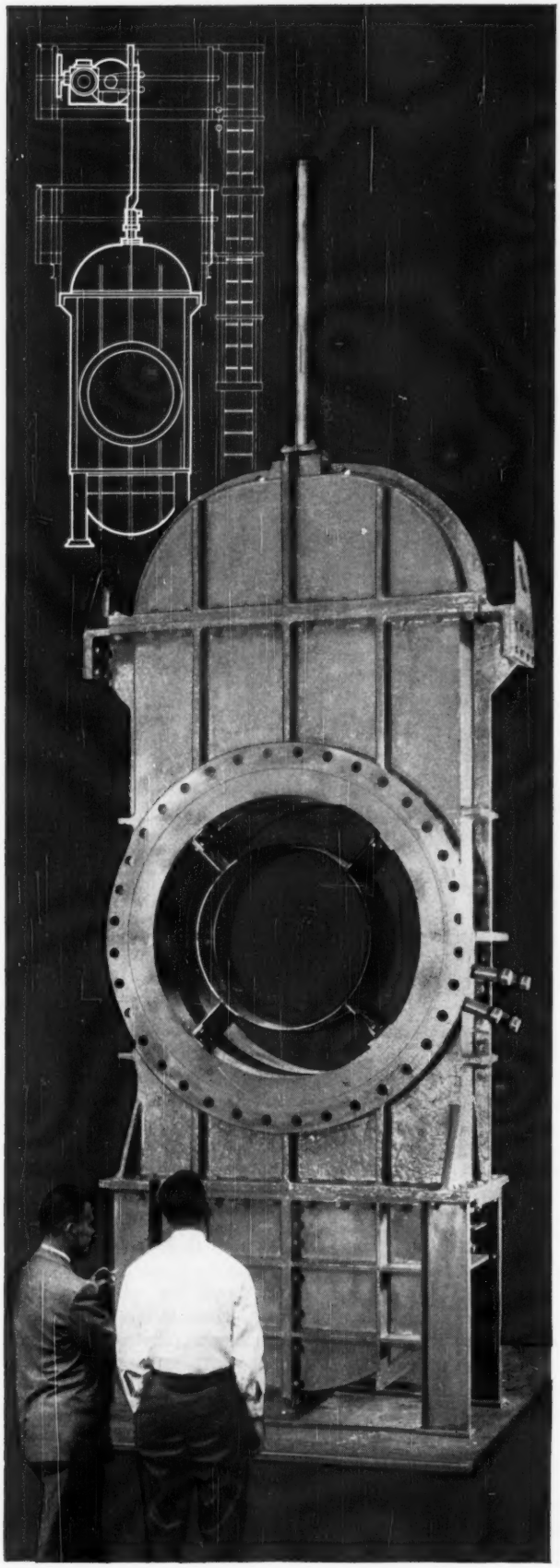
The new storage system will hold oxygen at 600 psi. The gas will be released, as it is needed, to the present storage tanks, where it will be held at 300 psi.

The gas is delivered to the blast furnace air system at 1.8 psi. Oxygen passing through open hearth lances is at 80 psi.

• Availability of more oxygen will permit blast enrichment at all the company's blast furnaces.

Two of Weirton's stacks are using oxygen. The other two will use the gas when supplies are adequate.

Oxygen lines are connected to the air intakes on the turboblowers, which push enriched air through the blast furnace tuyeres. Oxygen content in blast air is boosted to



NEW

fastest way of changing blast furnace stoves

BAILEY

WATER-COOLED GAS BURNER SHUT OFF VALVE

Full Open to Full Closed in 11 Seconds

Valve disc and body are water cooled to prevent overheating while the stove is on blast. Motor-operated drive unit is located on a platform above the valve, well clear of stove heat. This valve is bolted tight to the burner and stove saddle flange, thus preventing leaks at the burner. *Write for Bulletin GB-100.*

WILLIAM M. BAILEY COMPANY

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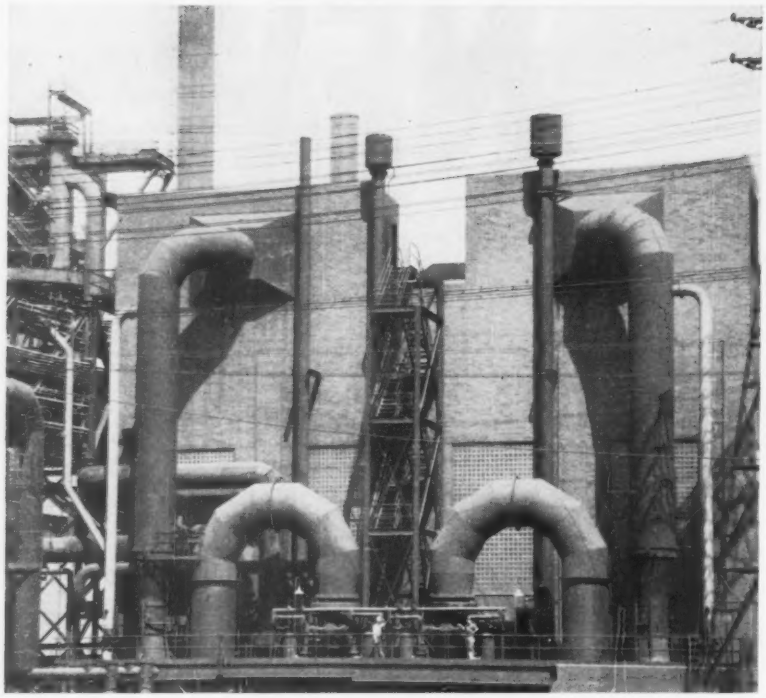


Oxygen lines join turboblower intakes outside the blowing room, to enrich blast furnace air before it is pumped through the tuyeres and into the stacks

about 23.9 per cent of volume (vs. 20.9 per cent in normal atmosphere). An automatic control system holds the oxygen-air ratio constant.

Other operational improvements are helping the company increase its hot metal output, says J. N. Strassburger, National Steel's vice president of research and development. Examples: Improved burden permits use of higher temperature air in the blast, and more efficient valving systems make for faster changes from one blast furnace stove to another.

• Increased use of oxygen in the open hearths should increase the company's steel output.

Weirton's open hearths turn out 550 ton heats, with a charge of 60 per cent blown metal from bessemer converters and 40 per cent scrap. Blast furnace hot metal isn't used in the charge; company officials say the blown metal (semirefined steel) is hotter than liquid iron and has a lower carbon and silicon content.

Oxygen is used in the open hearths as it is available. The new oxygen plant will permit use of the gas for all heats, says T. A. Thompson, open hearth superintendent, who expects the changeover to increase steel output at least 10 per cent. To make that increase, the company will train operating personnel to use oxygen efficiently.

• Roof lances do double duty in the company's furnaces.

The lances are used in the raised position for flame enrichment, to speed scrap meltdown. Then they are lowered and used in the conventional manner for decarbonization. Dual use of the lances eliminates the cost and upkeep of special oxygen equipment in open hearth burners.

Availability of oxygen for all heats will also cut decarbonization requirements on hot metal from the bessemers. Faster turnover in the converters will make more blown metal available for the open hearths.

The company plans to have basic roofs on all its furnaces, to take the higher temperatures developed with oxygen lancing. In Weirton's open hearth shop, 12 of the 14 furnaces are equipped with basic roofs of the suspended type, or reinforced with steel plates between brick courses.

West Coast Foundry To Cast 'T-1' Steel

A LICENSE to produce castings of United States Steel Corporation's "T-1" constructional steel has been issued to Alloy Steel & Metals Co., Los Angeles, after intensive evaluation of the low carbon alloy steel for castability.

The company is authorized to cast the material in a wide range of products; most of the castings will be marketed in 11 Western states.

• Castings will broaden the material's range of applications.

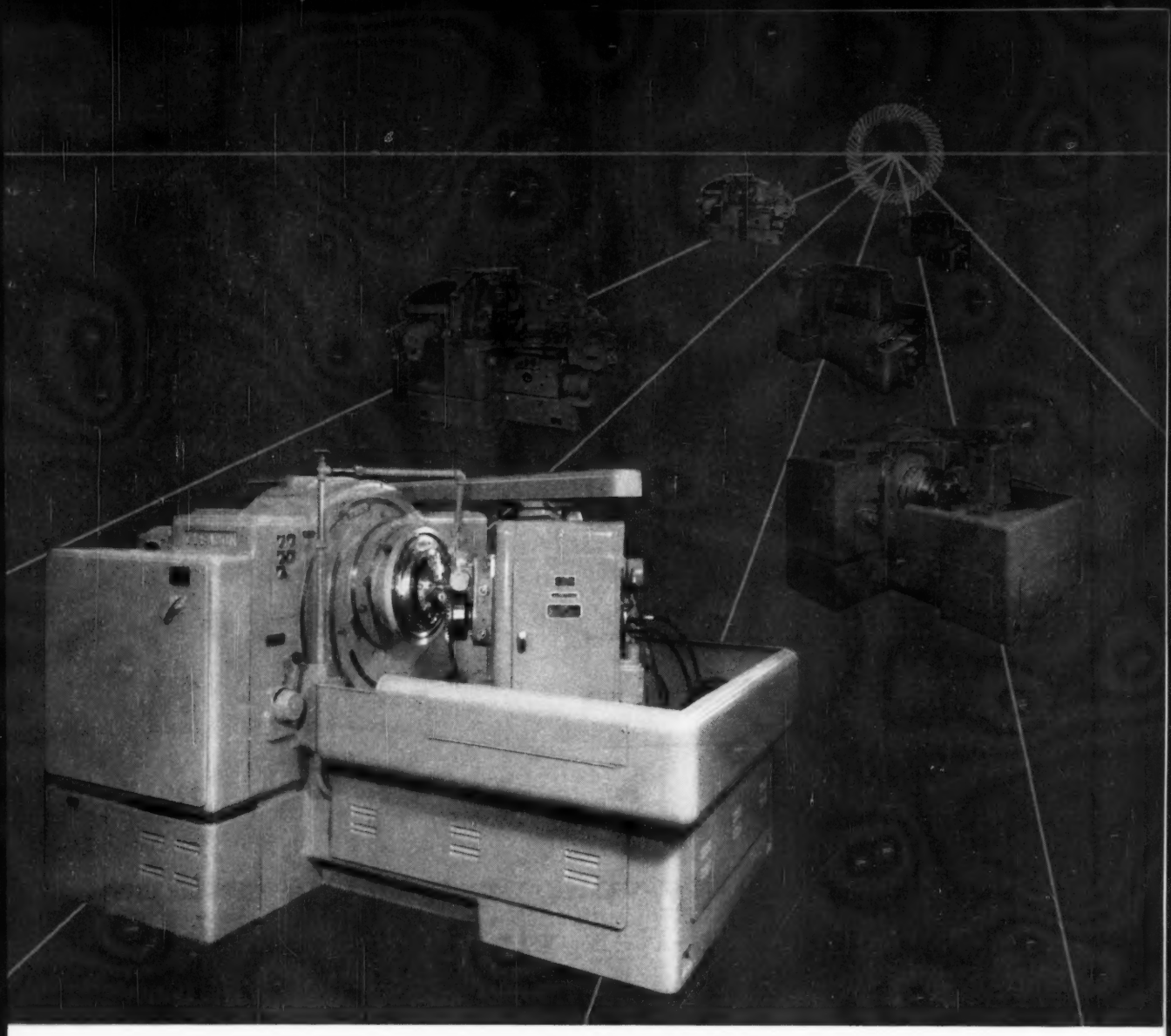
"Used in castings, the steel will give design engineers a versatile new tool for improving service life and operating economy of many types of industrial equipment," says Howard J. Mullin, U. S. Steel vice president-sales. "In plate or bar form, it has long been known for strength, toughness, field weldability, and resistance to wear and corrosion. Now, castings, will be available to supplement the many design uses already found. Cast forms of the material have the basic mechanical properties of mill products. They can be designed in virtually any shape or size, to put those properties exactly where they're needed for efficient part function, trim appearance, and low cost."

• High strength and fluidity were factors that influenced the foundry's material choice.

"Superior founding characteristics of the steel enabled us to use its high physical properties," says P. R. Francis, president and general manager of Alloy Steel & Metals. "That helps minimize overdesign to overcome foundry limitations in producing high quality castings of minimum weight.

"The steel has what we call a high-Q factor. It has high fluidity, which permits pouring at relatively low temperatures for the type product being cast. That makes for better finish and quality."

Industries in which the castings are applicable include ordnance, agriculture, highway trucking, heavy construction, material handling, crushing and pulverizing, dredging, logging, and mining.



Now . . . one machine does the work of five!

For small production runs—here's *one* gear-cutting machine with the flexibility of *five!*

The Gleason No. 118 Hypoid Generator roughs and finishes both gears and pinions—using four cutting methods that formerly required a battery of five machines. When production requirements increase, you simply add other machines, the 118 becoming a specialized member of your production team.

1. Single-Cycle® Method. Using this method, you can cut nongenerated gears four to five times faster than previously possible on machines of this type. Cradle and work head are locked in position. The last rotation of the Single-Cycle Cutter finishes both sides of a tooth space. You cut the mating pinions on the same machine, using the conventional single-roll generating method.

2. Cyclex® Method. For certain applications you can use the extremely fast Cyclex Method on the No. 108 Generator. You cut nongenerated gears in one completing operation from the solid blank.

3. Generated Gears and Pinions. You can produce both gears and pinions on this machine with the generating method. Here, a relative rolling motion takes place between gear or pinion and the rotating cutter. Once the gear is chucked in the work head, the machine operation is entirely automatic.

4. Unitool* Method. If you want to cut small quantities of spiral bevel, Zerol® bevel, or hypoid gears with a minimum of tooling, you can use the Unitool Method. You cut both gears and pinions with a single cutter. This method is particularly useful for experimental gears for prototype work.

*Trademark

The No. 118 Hypoid Generator handles gears up to 18″ diameter at a 10:1 ratio, to a *maximum* coarseness of 2 DP. For production of smaller gears, the No. 108 Generator cuts gears up to 8½″ diameter at a 10:1 ratio and to 4 DP. A third model, the No. 28 Hypoid Generator, cuts gears up to 33″ diameter at a 10:1 ratio, 1½ DP.

For complete information, send for bulletins on all three machines.

GLEASON WORKS

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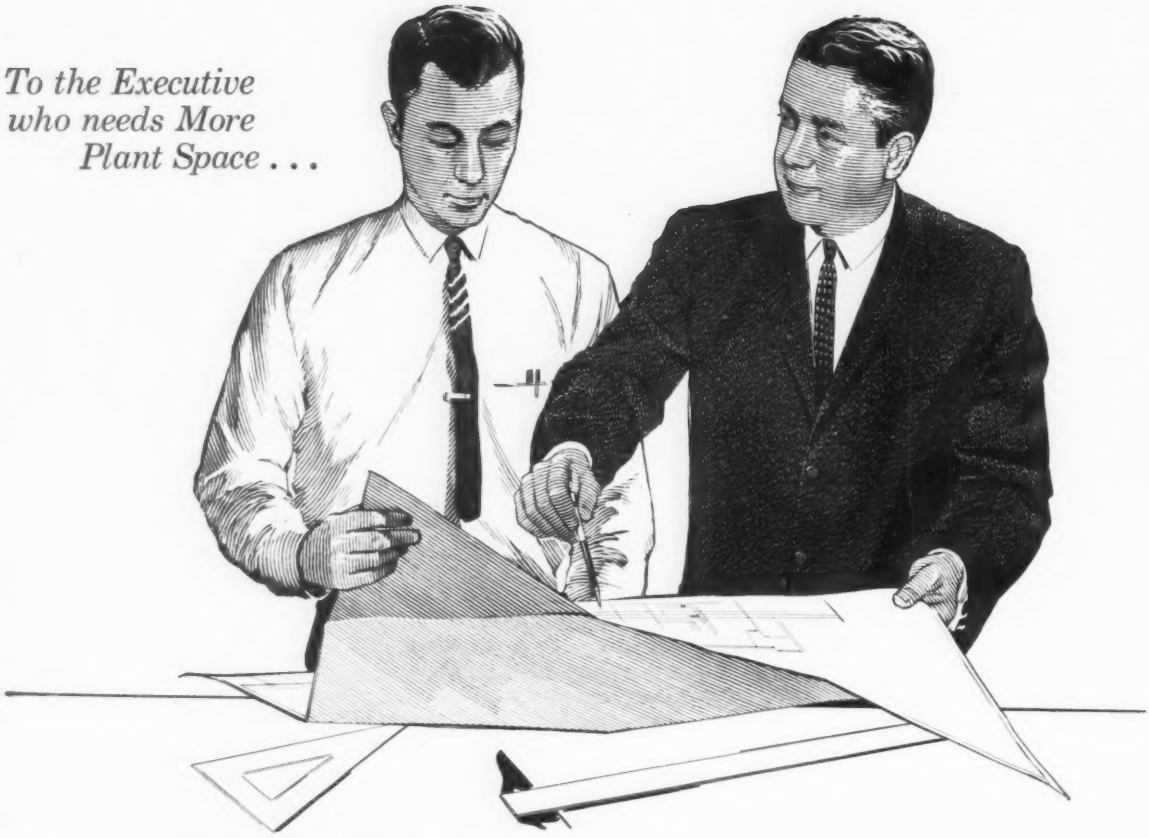
To the Executive who needs More Plant Space . . .



Why not <u>simplify</u> your present operations by using Clad-Rex® vinyl-clad metals?

Why not, indeed! Your investment in equipment, space and labor for finishing operations might be much more profitable in other activities. And what about the time and cost to strip and rework the rejects common to assemblies finished with relatively delicate coatings . . . ?

Clad-Rex vinyl-clad metals can be moved directly from forming to assembly, because they're already finished. This also eliminates a lot of costly metal treating and handling. The abrasion resistance of Clad-Rex sharply reduces rejects. As a matter of fact, the vinyl surface is so practical, Clad-Rex vinyl-clad metals can be worked much the same as bare metal. No special tooling or involved technique is needed.

These factors can lower your end product cost even though Clad-Rex vinyl-clad metals cost more to buy than *un*finished metals. Furthermore, you add sales appeal, because Clad-Rex styling is almost unlimited.

It's worth looking into—particularly when you realize your existing tooling (including forming dies) can be used in most cases. Clad-Rex has a Field Fabricating Engineer available to show your production people how easy it is to get into production.

See for yourself. Write and ask for details on Clad-Rex vinyl-clad metals. No obligation, of course.

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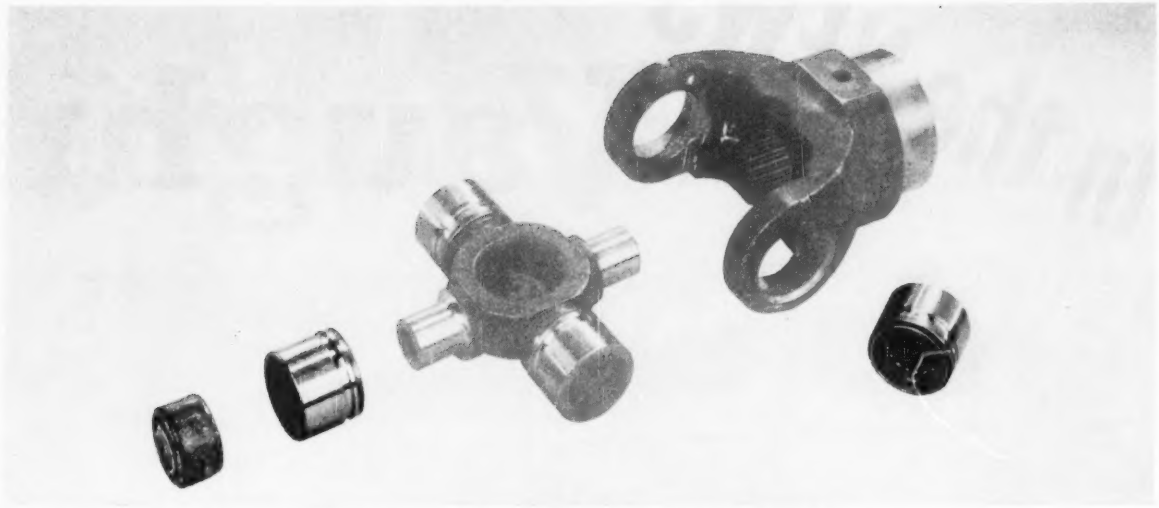


Steps in cold heading a universal bearing cup. The blank (left) is from 3/4 in. round wire. Also shown are a finished cup with ring groove and one with bearings in place

Cold Heading Process Trims Part Costs

Changing brought Saginaw Steering Gear Div. of General Motors Corp. several benefits: Cost reduction, quality improvement, and closer part tolerances

SUBSTANTIAL cost savings were realized when Saginaw Steering Gear Div., General Motors Corp., switched from screw machines to cold headers. The job: Forming blanks for universal joint bearing cups.

Quality was also improved by installing a high speed groove grinder, using a Hydra-Cam actuating mechanism. The changes made copper plating unnecessary, eliminated part distortion, and permitted closer tolerances and faster grinding speeds.

• **Partmaking**—Saginaw went from bar stock (SAE 1012) to 3/4 in. round wire of the same specification. The wire is fed into a draw and slug header before washing, grit blasting, bright annealing, and phosphating. It's soap lubricated, then goes to a 500 ton, vertical extrusion press which forms two parts with each stroke. The press has a capacity of 35 strokes per minute.

After washing, the cup blanks go through a battery of automatic chuckers which face the end and cut a relief groove at the bottom of the cup's interior for grinding wheel runout. Washing, carburizing, quenching, and drying operations follow. The outside diameter is rough and finish ground on centerless grinders. The cup then goes through a battery of inside diameter grinders. Air gages check the inside diameter automatically after this operation. The gages are set up to stop the machine if three consecutive parts are rejected.

Formerly, bar stock was run through eight spindle screw machines to rough form the cup blanks. Ring grooves were cut into the blank during screw machine operation. The grooves retain a snap ring which locates the bearing cup in the universal joint. About 55 per cent of the initial bar stock was lost in chipmaking. In addition, the cups had to be copper plated before hardening.

The cups are filled with needle bearings, capped, and then assembled onto the ends of the spiders in the propshaft universal joints.

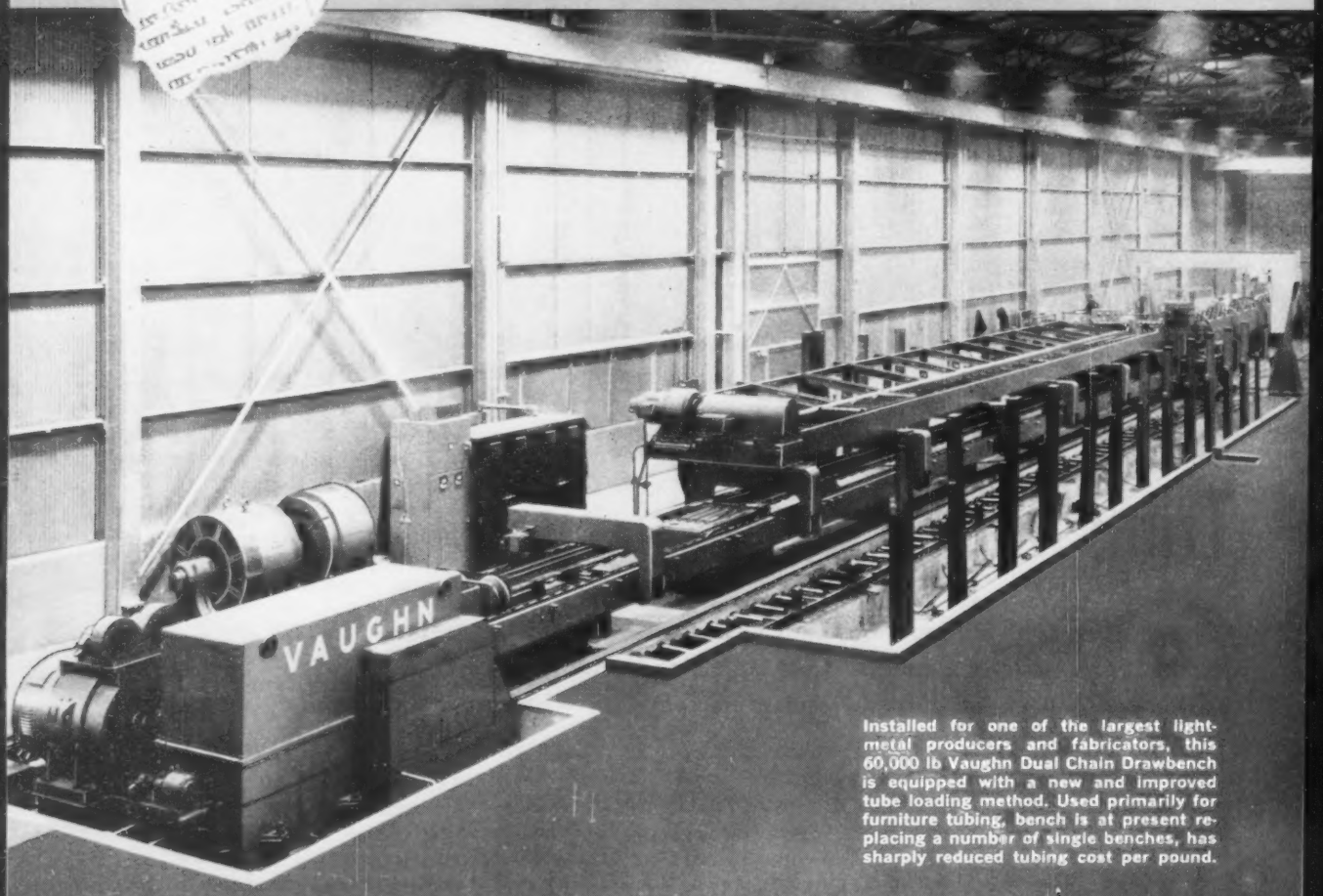
• **Tolerances**—The critical dimensions that must be maintained are the outside and inside diameters and the snap ring groove. The snap ring groove must be held within 0.002 in. from the bottom of the cup's interior. The groove is 0.11 in. wide and 0.040 and 0.045 in. deep.

• **Grinder** — The grinder's speed (2050 parts an hour) is made possible by a hydraulic camming device developed by Earl A. Thompson Co., Ferndale, Mich. It has allowed Saginaw Steering Gear to tighten up on tolerances. Part distortion caused by the hardening and heat treating following copper plating has been eliminated.

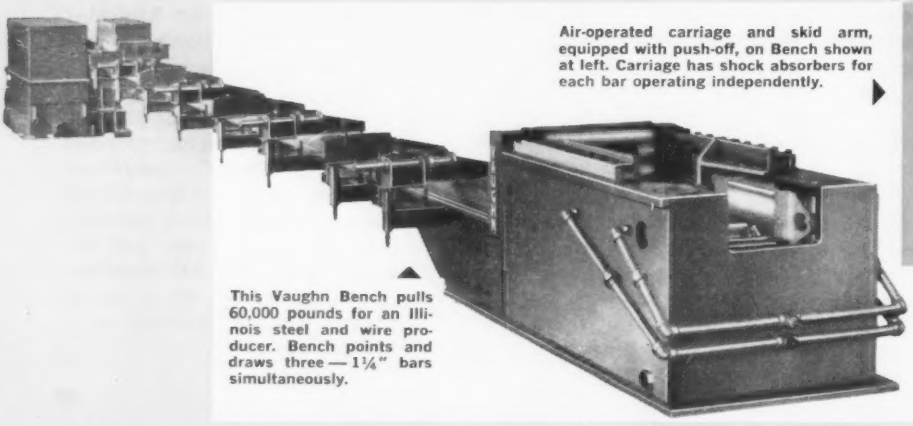
• **Hydra-Cam**—A single camshaft actuates master hydraulic cylinders which actuate slave cylinders performing a single motion in the grinding machine. Each operation requires a separate cam and cylinder arrangement. All slave cylinders are returned by a central low pressure oil reservoir in a closed system.

In the NEWS

Vaughn®

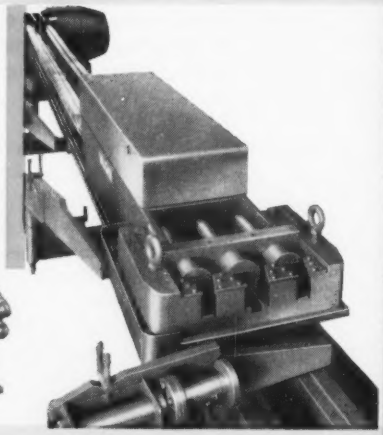


Installed for one of the largest light-metal producers and fabricators, this 60,000 lb Vaughn Dual Chain Drawbench is equipped with a new and improved tube loading method. Used primarily for furniture tubing, bench is at present replacing a number of single benches, has sharply reduced tubing cost per pound.



This Vaughn Bench pulls 60,000 pounds for an Illinois steel and wire producer. Bench points and draws three — 1¼" bars simultaneously.

Air-operated carriage and skid arm, equipped with push-off, on Bench shown at left. Carriage has shock absorbers for each bar operating independently.



Drawbenches

• NEW DESIGNS • HIGHER SPEEDS

• Finer Cold Drawn Production!

Vaughn Machinery Company—builders of the world's most complete line of cold drawing equipment—is proud to present advanced new Drawbench models for tubes, bars, and shapes.

Available in double and single chain types, these latest Vaughn Benches employ totally new loading concepts that permit drawing five tubes at a time *and more.*

Vaughn dual chain benches now in operation are drawing tubing up to 550 fpm—straighter tubing! In fact, generally higher speeds are now feasible with a new chain design which permits high speeds without lubrication problems.

New "floating" foundation design reduces installation and foundation maintenance costs. Many additional refinements contribute to Vaughn leadership in modern drawbench performance. Consult your Vaughn engineer on your cold drawing problems.

The Vaughn Machinery Company, Cuyahoga Falls, Ohio, U.S.A.

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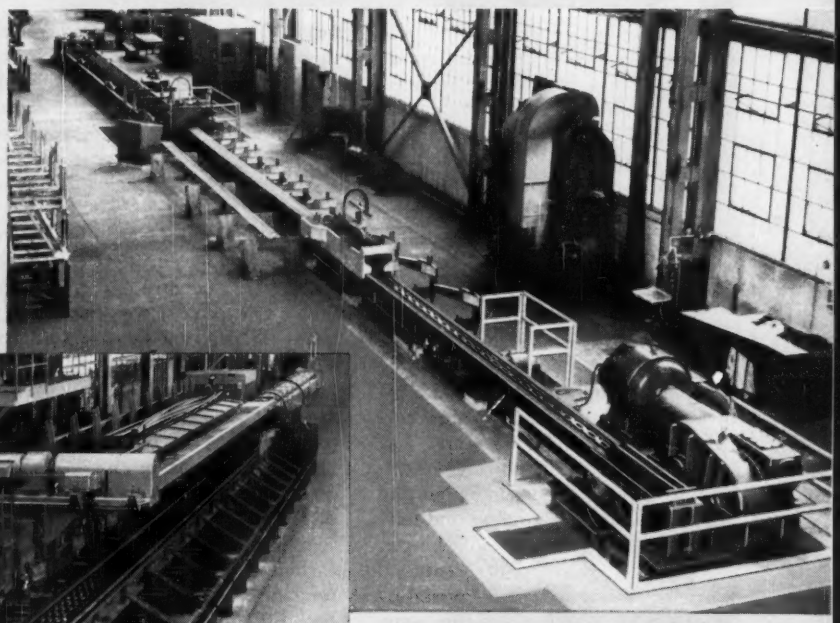
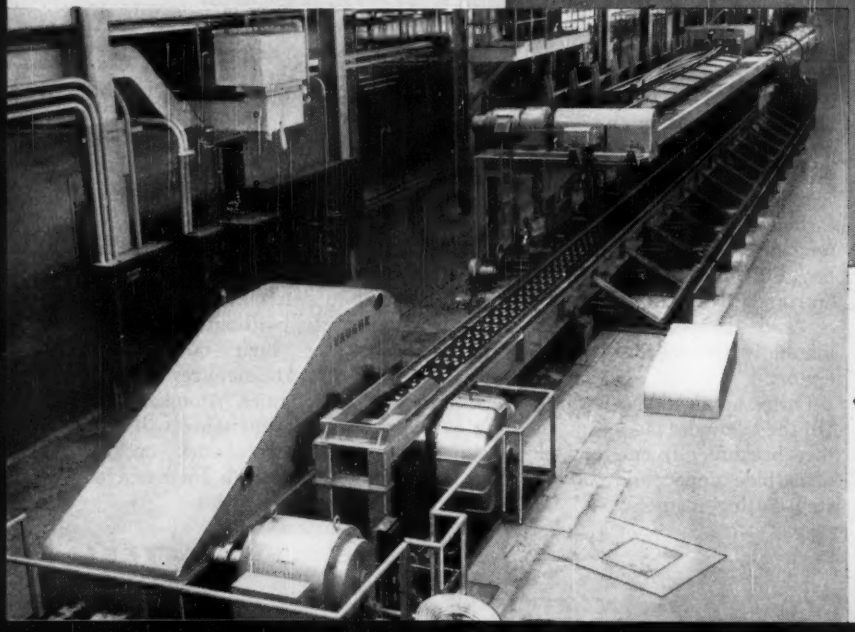
If it's Cold Drawn see **Vaughn**

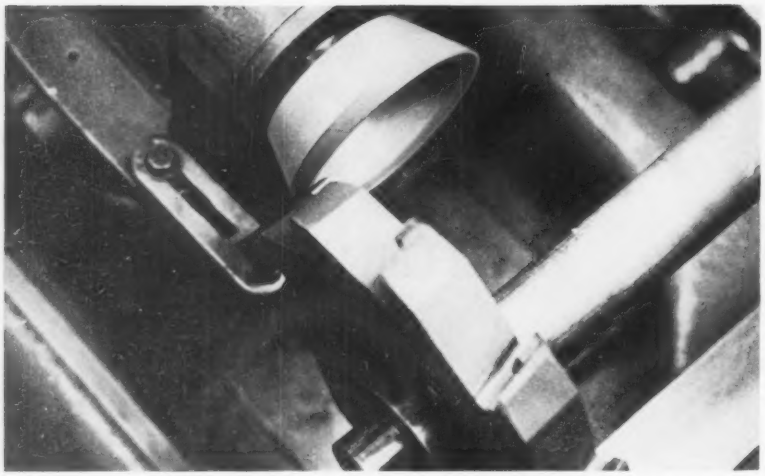
COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.





▲ **For another Illinois producer, this Vaughn Drawbench is equipped for bars, tubes and shapes. It is used primarily for shaving magnesium on a production basis.**

◀ **Installed at a large Canadian tubing producer, this Vaughn Drawbench includes roll-over mandrel end, carriage tube shock unit and air clutch. Canada's largest-ever order for copper tubing was recently drawn by this bench.**



Less corner breakdown was reported in grit evaluation tests using standard 5 in. resin bond cup wheels with thin or platelike diamond particles

Test of Diamond Abrasive Needles Shows Advantages

TESTS have indicated that a natural diamond abrasive material for grinding wheels has long life at reduced concentrations, reports Industrial Diamond Div., Engelhard Hanovia Inc., Newark, N. J., maker of the material.

Called SND-RB (Needle), the material is needlelike or platelike and produces good results in resinoid wheels at light to moderate infeeds.

• **Advantages**—The shapes can be held firmly in the resin bond. The particles also tend to break off a bit at a time, creating a sharp new cutting edge with every fracture. The company says the result is equivalent to having many more cutting edges per carat of diamond and having them stay on the job longer. Microscopic studies of diamond particles reclaimed from grinding sludge and swarf show an even breakdown.

In general, best results with untreated SND-RB (Needle) grit are reported at infeeds from 0.0005 to 0.0015 in. and higher. A specially treated grit is available with greater bond retention and increased friability for use in resin bonded grinding wheels at feeds under 0.0005 in.

• **Job Test** — A specialty carbide shop (Wetmore Tool & Engineering Co., Los Angeles) tried out the material. Controlled tests were conducted on standard 5 in. cup wheels containing different types of diamond grit on a rough production job.

The SND-RB (Needle) grit was used at 75 concentration (compared with 100 concentration of conventional grit). Wear was measured at about 25 per cent less on the basis of numbers of identical parts ground. Paul A. Kulju, chief engineer, also noted that corner breakdown was reduced.

The operations in this evaluation consisted of grinding the OD and side clearance on large diameter spar mill cutters with large, rough carbide blanks. It was necessary to remove $\frac{1}{8}$ to $\frac{1}{4}$ in. of carbide from both OD and sides. Work was done on standard Cincinnati No. 2 grinders and all speeds and feeds were manually controlled by skilled operators.

Other applications of the wheels (in the Wetmore plant) include fluting, backing off, and end clearing of carbide tipped and solid carbide step cutting reamers.

Fission to Power Shortcut Found

TWO ADVANCED METHODS of power generation have been combined by Westinghouse Electric Corp. scientists to convert the heat of nuclear fission directly into electricity.

A thermionic and thermoelectric generator was built into a nuclear fuel assembly and inserted into a reactor to produce electric power at the Westinghouse Testing Reactor, Waltz Mill, Pa.

• The generator takes advantage of extremely high temperatures at the center of the fuel elements.

"Significant power losses occur in nuclear powered generating stations, because of the temperature drop from the center of the fuel elements to the outside surfaces that contact cooling water," says Dr. William E. Shoupp, technical director of the company's Atomic Power Dept. "Some fuel elements reach temperatures above 4000° F in the fission process, but nuclear scientists can get temperatures of only about 600° F from the elements and into the surrounding water."

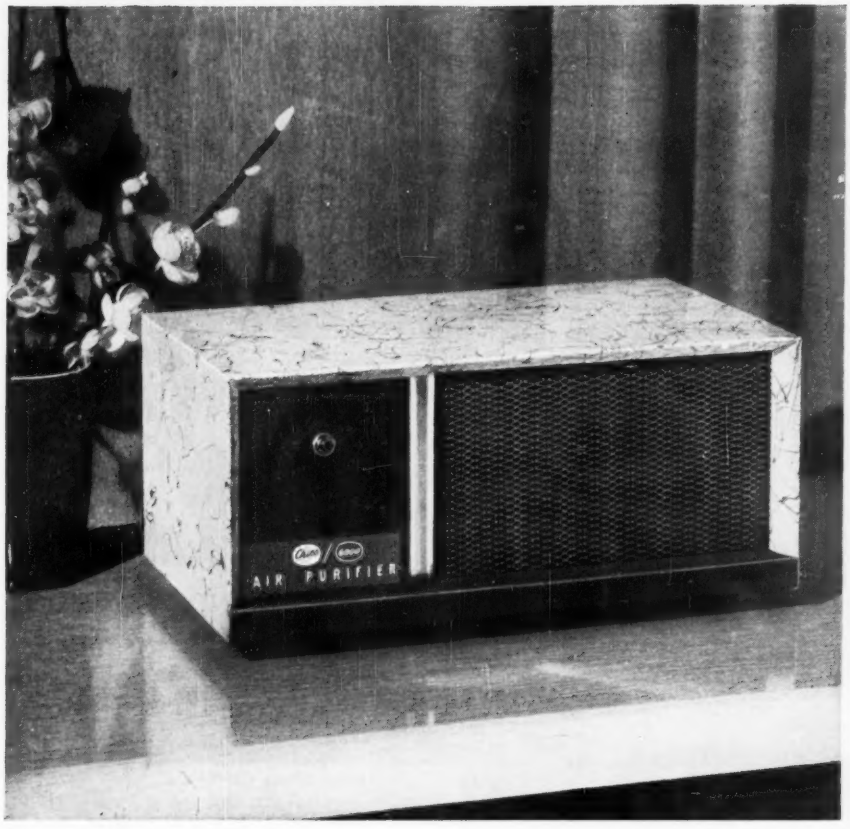
To exploit heat energy at higher temperatures, Westinghouse scientists built a fuel element with a thermionic generator in its center, and a thermoelectric generator around it. The thermionic unit operates best at 2700 to 3500° F; the thermoelectric generator turns in its best performance at 600 to 1800° F.

The two generators operate in tandem.

They produce a combined electrical output over a wide temperature range.

• More development work will be required to increase the efficiency of the device.

The experimental unit, which produced about 1 watt of power, was designed to determine feasibility of the generator, without considering efficiency or high output. Dr. Joseph C. Danko, manager of direct conversion activities, Atomic Power Dept., says Westinghouse will continue development work on the generator. The goal: Increased efficiency.



Chico air purifiers are made by Chico General Products Corporation, Burlingame, Cal. Penn Metal Company's distributor, Tayler Products Corporation, supplied the expanded metal.

Why new Multimesh is a favorite with designers

In the variety of those new expanded metal patterns you have the reason why so many designers are specifying Penmetal *Multimesh**. Working with any of these versatile meshes, it is easy to translate design ideas into reality. The result can be as distinctively handsome as this grille for the Chico air purifier.

Functionally, *Multimesh* is equally beneficial. It has the strength to withstand the abuse of every day use; the rigidity to span large areas in an unbroken sweep. What's more, the open mesh permits efficient passage of air.

Multimesh comes in both carbon steel and aluminum, in a number of different strand thicknesses. Can be readily cut, shaped and welded. For the full story, send for catalog 516-EM.

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PM-231

Penmetal — METAL MADE 1869 OF QUALITY

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a name to remember

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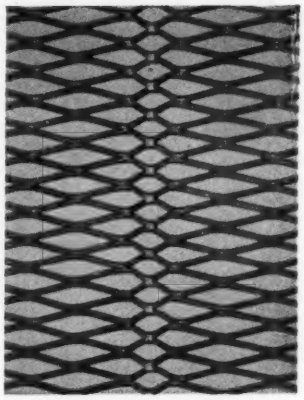

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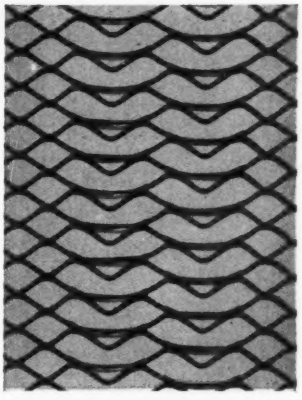
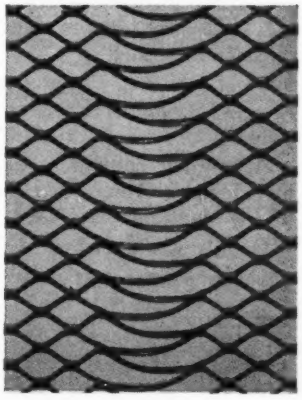
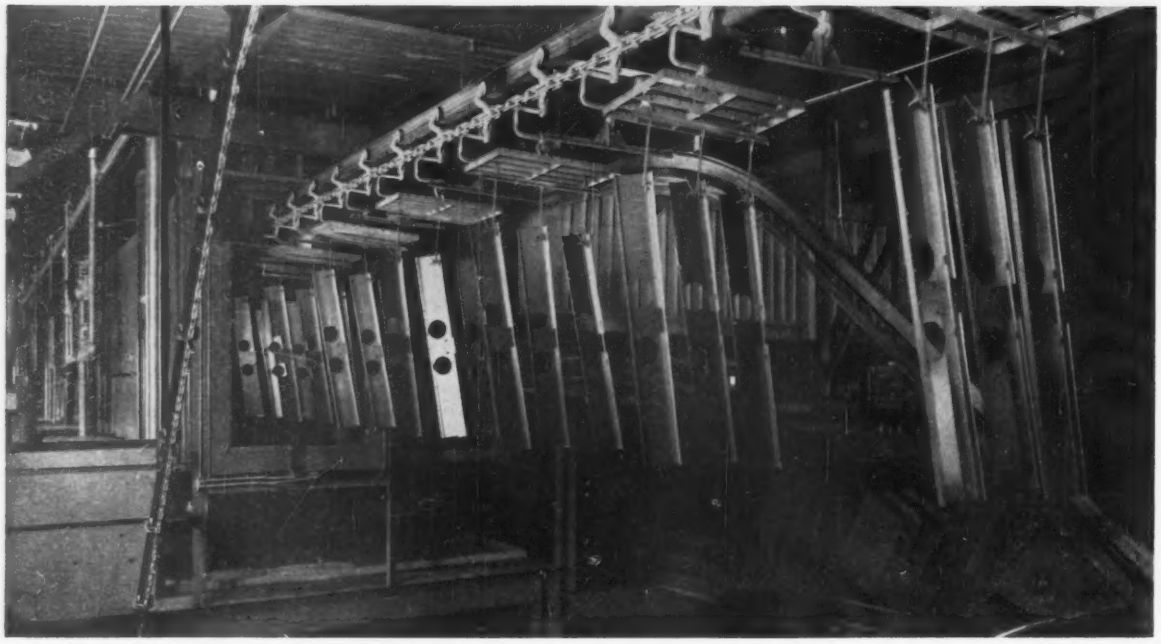


GARLAND



Automation Speeds Paint Dipping at Tappan



Parts entering Bonderite system (left) have just arrived from first floor loading. Those next right will only be cleaned and dried in the same system

It wasn't easy for engineers to sell management on idea until they coupled proposal with one for flying shear. Half dozen benefits that resulted make everyone happy

ENGINEERS at Tappan Co., Mansfield, Ohio, wanted a new paint dip line, but they ran into management opposition. So they added a recommendation for a new automatic, flying shear line. Management approved the dual installation.

It's easy to see why when you consider the benefits:

- Final part cost was pruned by a change in material (from sheets to coiled stock) and finish.
- A painting bottleneck was eliminated, and provisions were made for future production increases.
- Quality was improved.
- Shearing scrap was reduced, and fewer sheet sizes were needed.
- Labor was cut.
- The system provided greater flexibility for engineering changes.

• The shear line saved 2 per cent of Tappan's steel volume (1400 tons a month) and reduced the number of stock sizes needed to handle production. Output is scheduled for immediate use to take advantage of the superior forming properties of newly leveled steel.

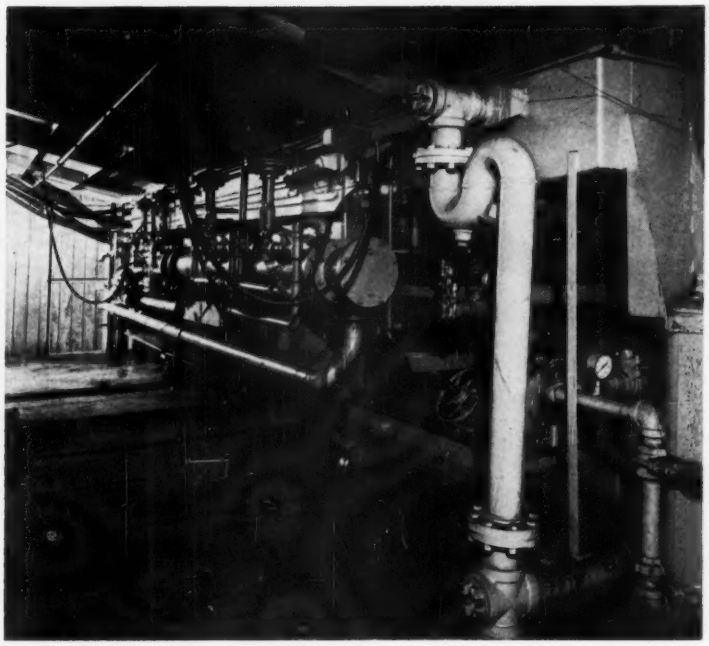
Appliance parts, other than those which are porcelain enameled, were made of black oxide, zinc coated, or galvanized steel sheets blanked from one of more than 150 sizes stocked. Now, such parts can be formed from less than 90 sheet sizes cut from standard coils of cold rolled steel. Price differentials between the coils and coated sheets are considerable, say Tappan officials. (An informal estimate: 2 cents a square foot.) The main scrap saving came from the elimination of sheet ends.

The shear, made by the McKay Machine Co., Youngstown, processes a coil of cold rolled steel into flat sheets of any predetermined size. A dialing arrangement permits operators to select and control sheet lengths to within 0.010 in. It is tied in with a precisely calibrated final roll in the leveler which measures the sheet lengths as they pass through.

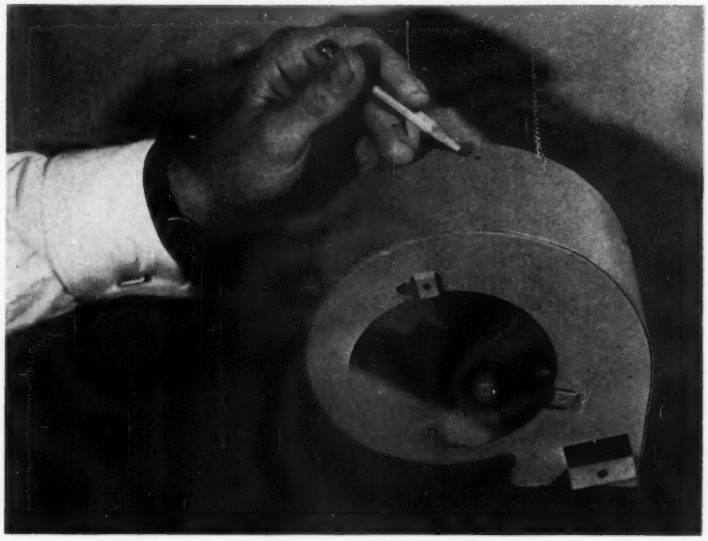
Directly from the coil, strip passes through a series of rolls which flex the metal past its yield point seven times. That flattens the sheets and eliminates the Young's modulus or strain point for 6 to 24 hours. Production is scheduled so that drawing and forming are done right after shearing to take advantage of that effect. "For one thing," says Gil Dobson, industrial planning manager, "we find it eliminates crow's feet defects in deep drawn parts."

Changing sheet sizes is a simple matter of dialing the shear measuring device. Production scheduling is much simpler when engineering changes must be made.

Dip tank in position receives conveyor line with parts for paint. Entire tank can be moved to one side if it is necessary to bypass for subsequent color coating



Air-hydraulic cylinder moves 2700 gallon tank on an angle iron track. System handles about 12,000 pieces (more than 350 shapes and sizes) per shift



Tappan engineers have been resourceful in adapting parts to a dip operation. Odd shapes like this fan housing, for instance, can't ordinarily be dipped—two vent holes did the trick

• **The new dip line is completely automatic. Formerly, parts were hand dipped in Japan black and dried in a batch-type oven.**

"We decided that an epoxy base finish coat over a Bonderite base would improve the coated sheets," says Harold Moyer, assistant superintendent of finishes.

Since available space would not accommodate a dip line, construction people decided on a second story directly over the old section housing the hand dip vats. When the new section was completed, it freed 4000 sq ft of floor space for press shop expansion.

The dip line conveyor moves at about 15 ft per minute, taking 1 hour 20 minutes to complete a cycle. Parts are loaded on the main floor. They pass to the second floor and move through a standard, 100 ft Bonderite system, emerging through a drying and cooling section before being dipped.

When dipped, parts either pass through a flash dry before spray coating, or directly to a final air-drying oven held at 370° F.

If necessary, parts are color sprayed directly on the Bonderite, dip primed and color sprayed, or simply dip primed. The entire dip tank can be moved to one side if parts must be bypassed to the spray booths.

Except for part loading and spraying, the operation is automatic and requires only one control man to watch, replenish, and regulate the system. "The quality of our finish is 100 per cent better," says Mr. Moyer. "Even the edges of parts, formerly raw on coated stock, are protected by the paint film."

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.

Since 1945 . . .

not a cent to maintain refractory concrete slow-cooling pits

For fifteen years these slow-cooling pits have been absorbing sudden thermal shocks as red-hot railroad axles are lowered into them. And with no maintenance required! Pits like these, constructed with LUMNITE calcium-aluminate cement and suitable aggregates, have low volume change which makes the concrete highly resistant to heating-cooling cycles. The monolithic walls have no vulnerable edges or joints that can be battered during charging and unloading. Construction of refractory concrete pits is economical, too. No skilled labor is required; reinforcing is easily built in; and concrete reaches service strength in 24 hours.

For greater convenience, castables containing LUMNITE cement are available from leading manufacturers of refractories. These are packaged mixtures, ready to use. Just add water, mix and place. For information write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

Nine of these slow-cooling pits, constructed with LUMNITE cement, have established service records at the Wheel and Axle Division of U. S. Steel's Homestead District Works. Pits measure 14'x14'x6' inside; walls taper 12" to 20" thick, top to bottom. Built by Rust Furnace Co., Pittsburgh.

Universal Atlas Cement
Division of
United States Steel

L-212

"USS," "Atlas" and "Lumnite" are registered trademarks

Offices: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

Vertical Spindle Machine Has Numerical Control

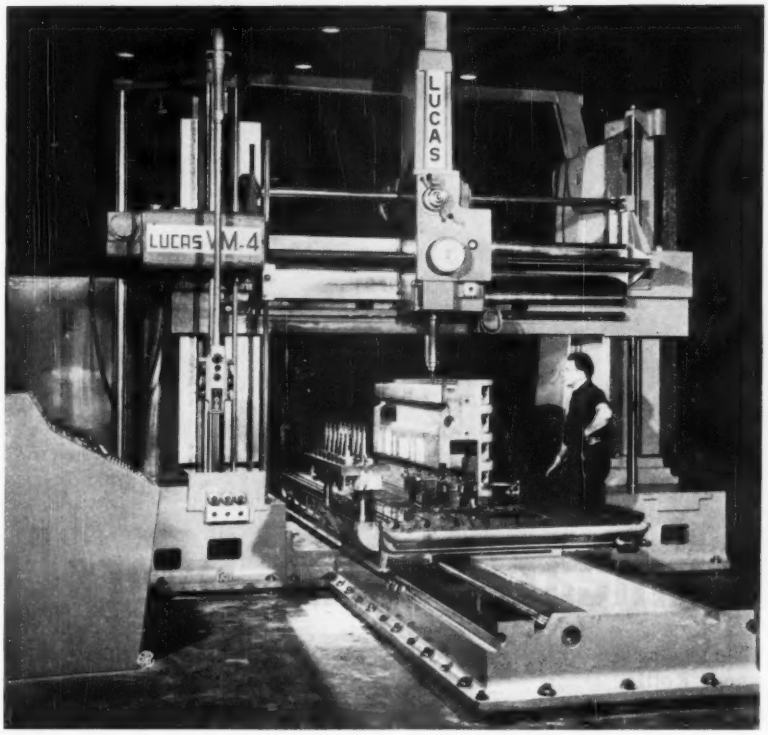
THIS machine operates under General Electric's three motion, numerical control. The vertical spindle can be positioned for boring, drilling, milling, or tapping to tolerances of ±0.0002 in.

The operator can control the machine manually from the pendant station or automatically from the console. The electronic control interprets punched tape instructions for positioning, tool changing, feed rates, and automatic machining sequences.

Tool carrying arms or mechanical linkages are not required. Tools stand upright in a pigeonhole magazine mounted on the side or on the surface of the worktable. An orienting control stops the spindle rotation always at the same point to line up the drive keys.

The tool is secured by a power tool lock and ejector.

For further information, *write* Lucas Machine Div., New Britain Machine Co., 12302 Kirby, Cleveland, Ohio.

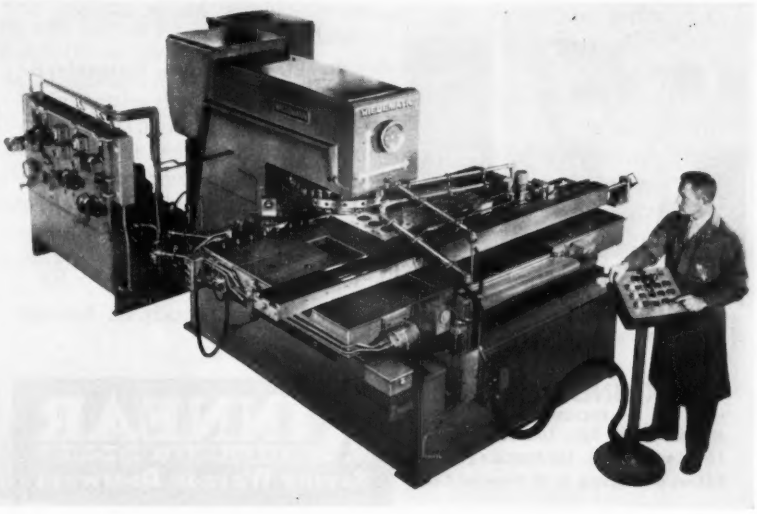


Turret Punch Press Pierces 60 Holes a Minute

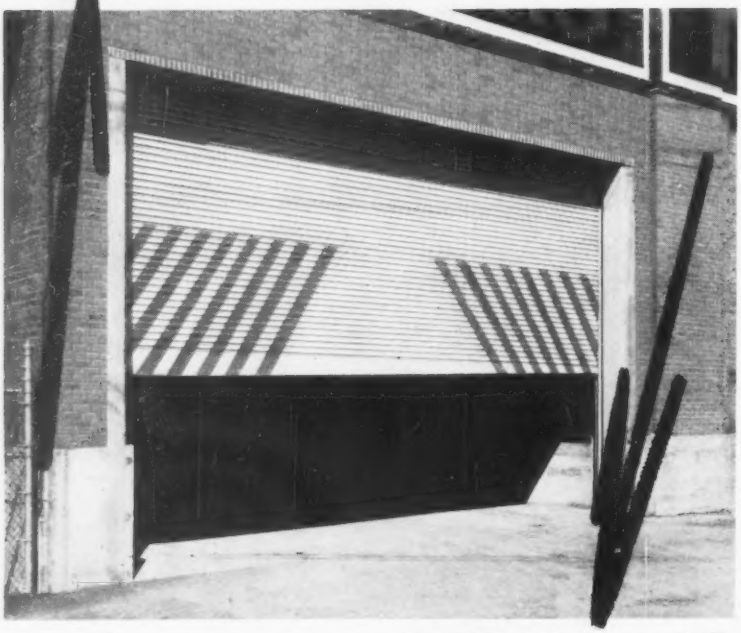
THE NEW, 15 ton capacity, Wiedematic turret punch press comes with numerical positioning control. Holes can be automatically located and pierced at the rate of 60 a minute. That includes tool changing.

The A-15 Wiedematic is one of a line of tape controlled presses from 15 to 150 tons capacity. It can pierce a 3½ in. diameter hole in 14 gage mild steel. Sheets to 30 x 48 x 3/16 in. can be handled.

The unit operates at 200 crankshaft strokes a minute and the table moves at a rate of 500 in. a minute. Turrets carry 26 to 32 different punches and dies. The tape controls the rotation of sets into piercing position. The unit uses stand-



UP goes door efficiency –



as door costs go DOWN, with

Kinnear Rolling Doors

The *coiling upward action* of Kinnear Rolling Doors saves time, manpower, and money!

The curtain of interlocking steel slats, *originated* by Kinnear, provides *vertical* door action at its very best!

All floor and wall space is fully usable at all times.

Even ceiling areas remain completely clear; leaving maximum room for use of hoists, lift trucks, and similar equipment.

When closed, the doors form all-metal barriers against wind, weather, intruders, and vandals.

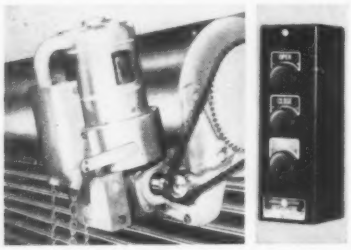
Steel or Aluminum

Kinnear Rolling Doors are made of steel, aluminum, or other metals. Built to fit any opening in old or new buildings. Motor, manual, or mechanical control.

Steel Doors Heavily Galvanized

Heavy, hot-dip galvanizing gives Kinnear's steel doors lasting resistance to corrosion and the elements (1¼ oz. of pure zinc per sq. ft. of metal, ASTM standards). Kinnear Paint Bond makes them ready immediately for thorough coverage and adherence of paint.

Write for full details on Kinnear Rolling Doors.



Kinnear Power Operators give time-saving, push-button control of Kinnear Rolling Doors — from a single point or any desired number of convenient locations.

The KINNEAR Mfg. Co.
FACTORIES:
1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

KINNEAR ROLLING DOORS
Saving Ways in Doorways

ard, eight channel, 1 in. wide, punched paper tape. The tape contains three place decimal dimensions for the x and y center line hole dimensions and turret station. The machine will be shown at the Machine Tool Exposition.

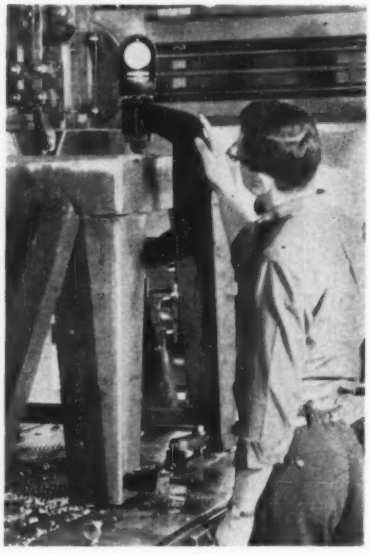
For further information, *write* Wiedemann Machine Co., Gulph Road, King of Prussia, Pa.

Mobile Hardness Tester Gives Rockwell C Readings

A PORTABLE hardness tester consists of a clamping device (C-clamps with varying throats) and an indenter head. Clamp pressure holds the unit on the work.

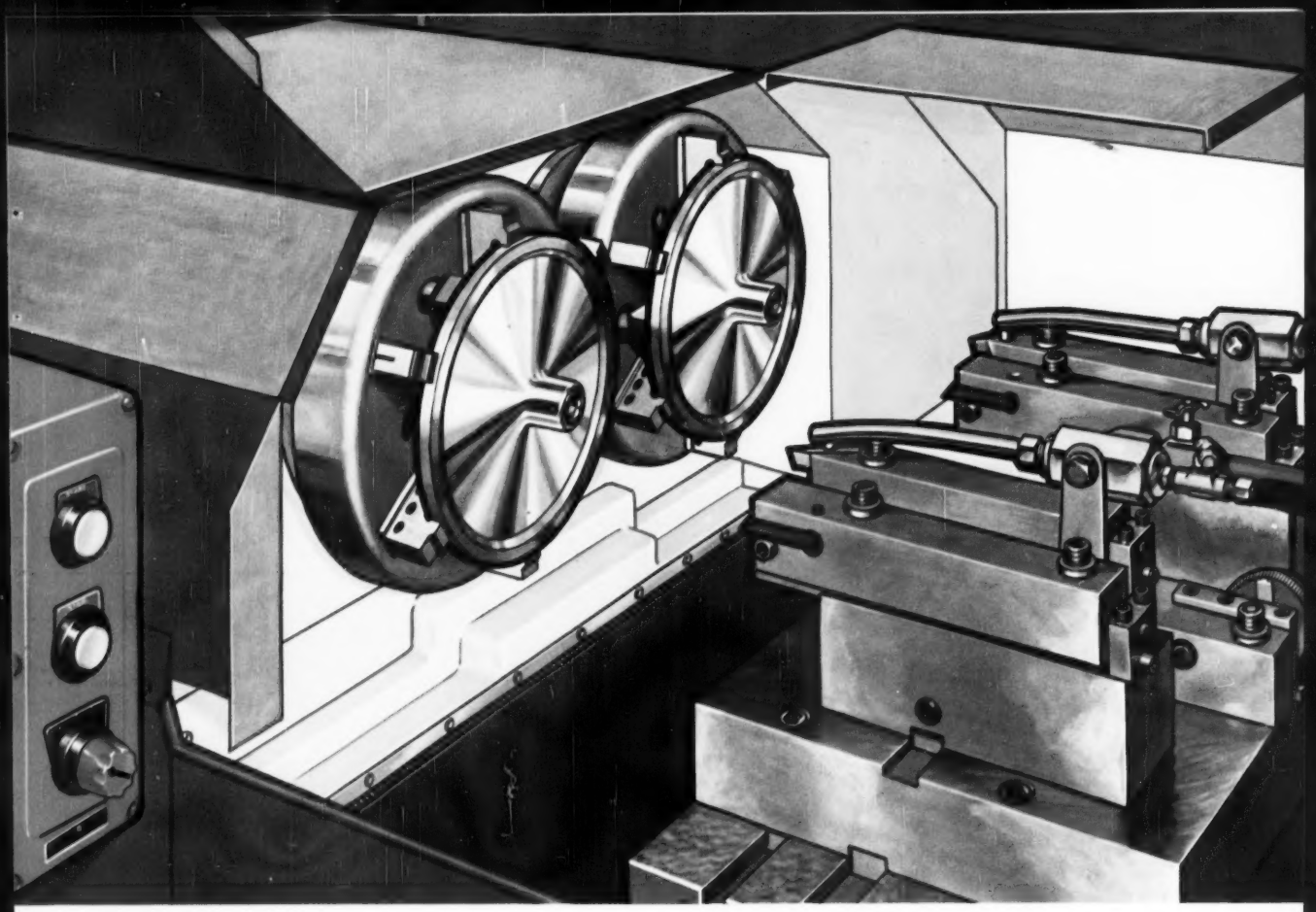
Minor and major test loads are produced by springs which are preloaded and contained in an individual spring sleeve. For different load ranges, complete spring units are interchangeable. The tester is available with various clamping designs.

Model M-I gives readings in the Rockwell C scale with a distance of 0 to 6.3 in. between the anvil and



penetrator. The depth of throat is 3.3 in. The unit weighs 17 lb.

Model M-II also gives Rockwell C readings with the distance between the anvil and penetrator of 0 to 9.8 in. and throat depth of 5.1 in. It



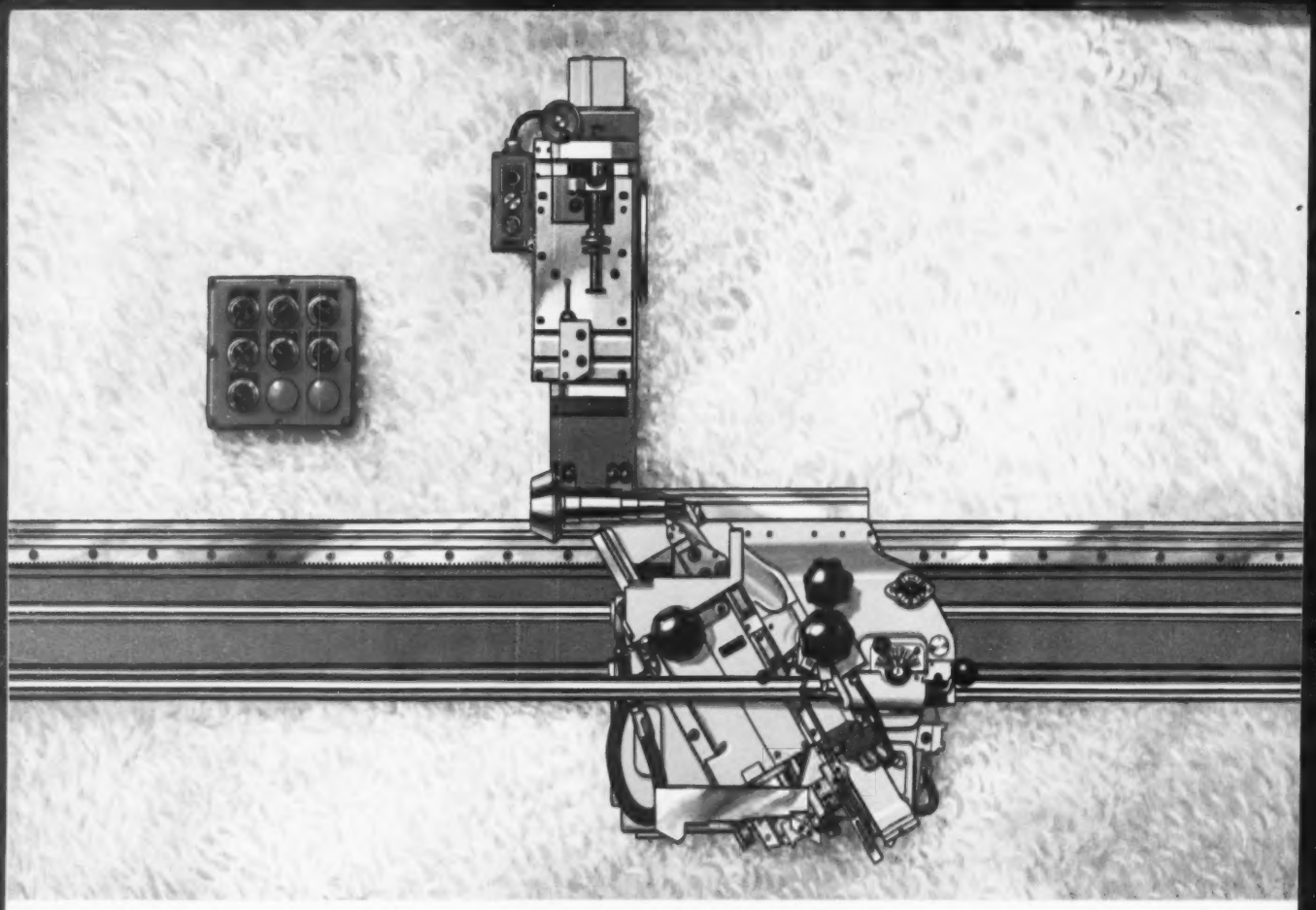
Consistent accuracy to tenths at super speeds

Model 37 Precision Boring Machine is a machine with a mission, rather than an answer to everybody's metal turning problems. Its mission is contour boring and turning in applications where both extreme repetitive accuracy and high production are of paramount importance. If you have such a requirement, Model 37 is an unbeatable money-maker.

It is an inherently simple machine: simple to operate, with inspection limited to gauging any one dimension. Simple in operating principle, too, built around precision cams that operate without being affected by temperature fluctuation. From one to four high speed spindles can be mounted on a single machine.

We would be happy to discuss *any* production problem involving straight or contour boring and turning. We doubt that anyone equals New Britain's know-how in this area, and we have a wide variety of boring equipment, both vertical and horizontal and of very advanced design. No matter what your work, or production requirements, this is a very fine place to look for an answer. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division - New Britain, Connecticut



Fast, rugged New Britain +GF+ copy lathes

Right from the ground up the New Britain **+GF+** is a machine conceived, designed and manufactured as a copying-contouring lathe. Not a standard lathe with copying attachment; not a factory-made "special" with the contouring feature built on components from other lathes; but a solidly based, ruggedly constructed, fast, powerful, accurate machine designed solely for the template-controlled, rapid production of between-centers or chucked work with external or internal contouring.

A million pieces or just a few, it's a machine you'll use on many different types of short-run jobs (just change the template and reset the controls), or on one long-run job (just replace the single-point tool when it wears).

The instantaneously accurate hydraulic copying mechanism is entirely enclosed within the compact carriage. All controls are within easy reach. The template is up front for easy adjustment. The chips fall free into the wide open base, can't clog or jam any part of the mechanism.

There are endless variations available within the New Britain **+GF+** line. The standard model has applications anywhere on between-centers or chucked pieces. Other attachments and models are available to suit your particular requirements; infeed attachments, automatic loading, bar stock models, etc.

Don't buy any lathe or "special" for copy turning until you have investigated the New Britain **+GF+** copy turning lathe. As a starter, may we send you the latest catalog?

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut

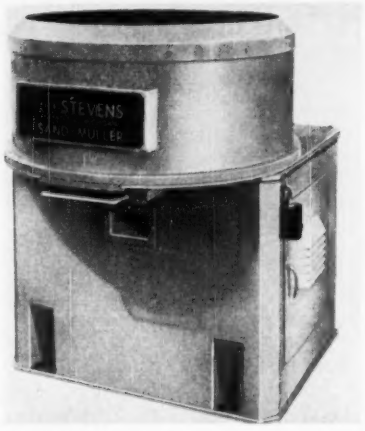
weighs 18 lb. Accessories are available.

For further information, *write* American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn.

Sand Muller Mixes 400 lb In Less Than 1 Minute

A MULLER can do batch mixing of sand with various binders (including CO_2, air setting, resin, and core oil) used in production of sand cores and molds. It has a rated capacity up to 400 lb.

The unit is 4 ft high and is easy to load. Floor space requirements are 7 sq ft. A 400 lb batch can be



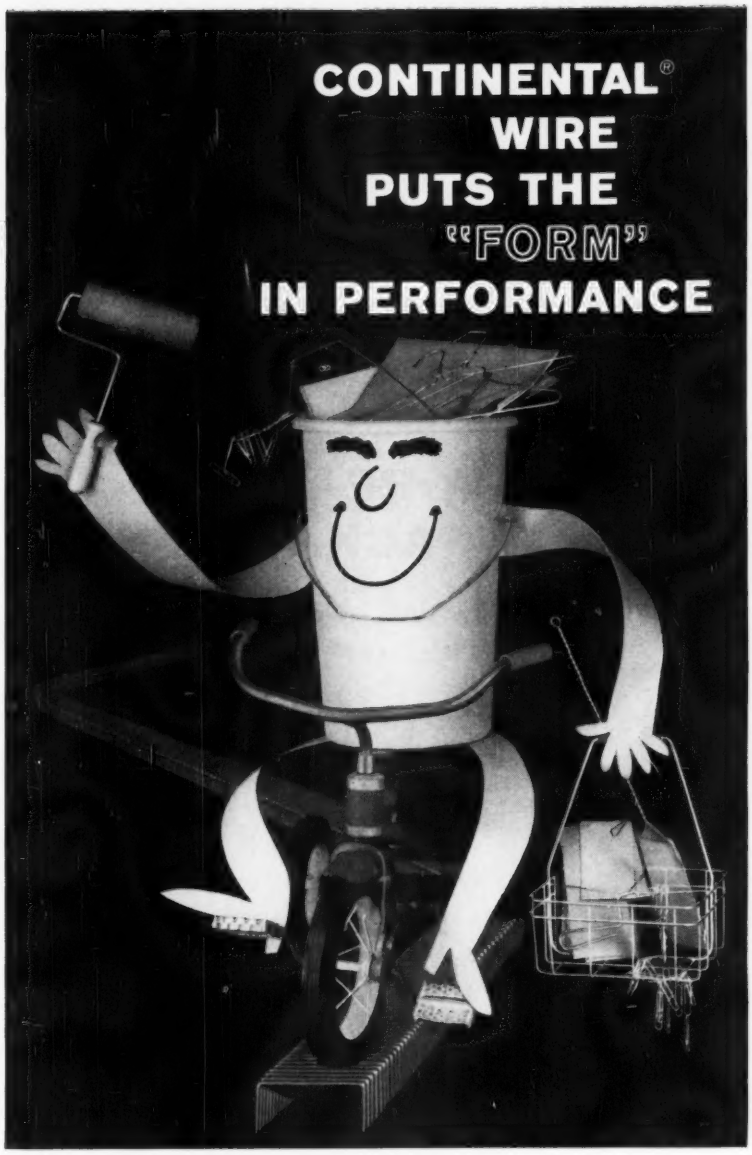
mixed in less than 1 minute and can be discharged as fast as can be handled by an operator.

For further information, *write* Foundry Sales Dept., Frederic B. Stevens Inc., 1800 18th St., Detroit 16, Mich.

Epoxy Casting Compound Is Self-Extinguishing

A TWO component, filled epoxy, casting system (Hysol, 15-032) is recommended for use on transformer and other electronic and electrical parts.

It is designated as nonburning under ASTM D635-56T, and is listed as self-extinguishing on the basis of MIL-I-16923C and MIL-T-



Formability that permits difficult twists and bends . . . sustained fast production in coil after coil . . . smooth tight coatings that do not powder, flake or peel to jam machines. Such wire calls for consistent, uniform quality. You can get it at Continental, in sizes and finishes to meet most specifications—from 5/16" on down to 40 gauge, in various tempers and analyses, in low and medium low carbon steels. Special shapes, too. Why not let our mill technicians work with you on any problems you may have pertaining to wire fabrication. We may have the answer to a particular need. Write today for your FREE copy of our new wire manual.

Wire Specialists for over half a century

CONTINENTAL STEEL
CORPORATION KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame Sealed, Coppered, Tinned, Annealed, Liquor-Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products

27A tests. It's flexible and can be used as imbedding material and required to meet thermal shock conditions.

A section of the cured material snuffs out immediately upon removal from the flame.

It's available in white and pastel colors.

For further information, *write* Hysol Corp., Olean, N. Y.

Degreaser and Stripper Has Corrosion Inhibitor

YOU CAN quickly and safely remove grease, oils, gum, carbon, wax, dye, and other soils from metals, plastics, concrete, glass, and other porous and nonporous surfaces with Fabulene cleaner. It's water soluble. The product also contains an inhibitor to prevent corrosion on ferrous and aluminum surfaces.

The degreaser and stripper can be use full strength or diluted with several parts of water. Personnel using the material are not exposed to fumes or danger of explosion, says the company.

For further information, *write* Elgene Co., 152 E. First St., Mt. Vernon, N. Y.

HERE'S A REAL PROFIT PACKAGE

for minimum volume gas users . . . a single base, completely packaged gas generator that will produce all the gas you want, when you want it, at lowest possible costs. Even minimum gas users have found they can amortize the cost of an efficient Gas Atmospheres system over a few short months.

Gas Atmospheres builds factory assembled and tested packaged units for the production of reducing, nitrogen, carbon dioxide, hydrogen, inert and annealing atmospheres for use in the metal, food, petroleum and chemical industries—from 50 cfh to 50,000 cfh. If you use gas why not make certain you have the most efficient operation possible. Call in your Gas Atmospheres engineer today or write direct to *Gas Atmospheres, Inc., 3855 West 150th Street, Cleveland 11, Ohio.*

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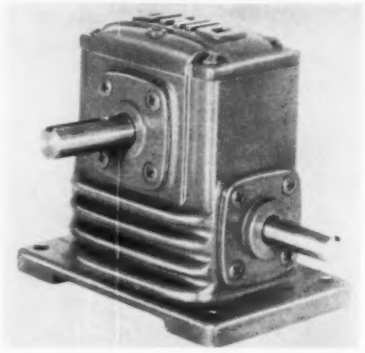
Worm Gear Speed Reducer Has Increased Capacity

A FAN cooled, worm gear, speed reducer designated Series S-13 is capable of delivering up to 80 per cent more capacity than nonventilated models of equal size. It's designed for horizontal, right angle drive with the worm below.

You can get a complete range of sizes from 1.33 to 5.25 in. center



distance. Horsepower ratings range from 1/16 to 18.

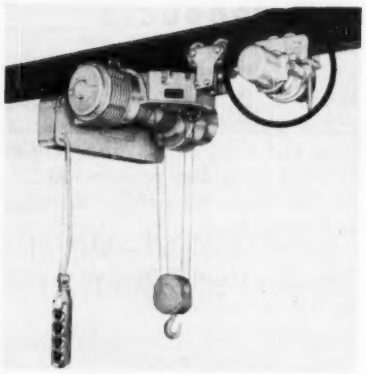
For further information, *write* Ohio Gear Co., 1400 E. 179th St., Cleveland 10, Ohio.

Tractor Quickly Installed On Trolley Hoists

A COMPACT hoist tractor can pull loads of 13,000 lb at speeds up to 60 feet per minute. The unit weighs 83 lb and requires 13 in. of rail space. The tractor requires 12 in. of headroom.

You can get the unit with single or dual speed controls. It's also available with separate pushbutton controls, or with integrated hoist and tractor controls. The standard model is single speed 220 volt, three phase, 60 cycle. Options include voltages from 110 to 550, and 50 instead of 60 cycle current.

Power is transmitted to the under-



side of the beam by a solid neoprene tired, drive wheel under adjustable spring pressure. It has an oil smooth, adjustable, torque brake and a special, soft start motor to minimize jerking or swaying.

For further information, *write* Harnischfeger Corp., 4444 W. National Ave., Milwaukee 46, Wis.

Telescoping Floor Crane Has Hydraulic Control

A PORTABLE floor crane has a three position, telescoping mast and boom, providing a maximum reach of 62 in. and a maximum boom height of 105 in. In maximum positions, load capacity is 700 lb. Load capacity in retracted position is 1500 lb.

A double acting, hydraulic pump

unit permits the operator to lower a load at any speed. The 2 in. ram type cylinder automatically

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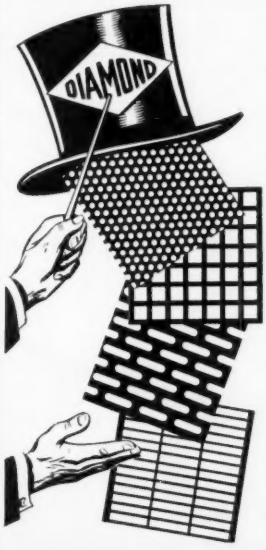
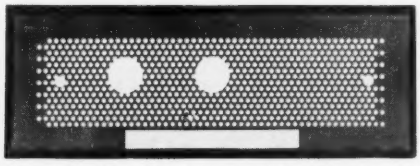


ANYTHING
IN
Perforated Metal

We're not magicians but, in nearly half a century of successful experience, have acquired such a wide range of dies, tools and other plant facilities that almost anything in the way of perforated metal sheets, plates, or parts can be produced efficiently and economically.

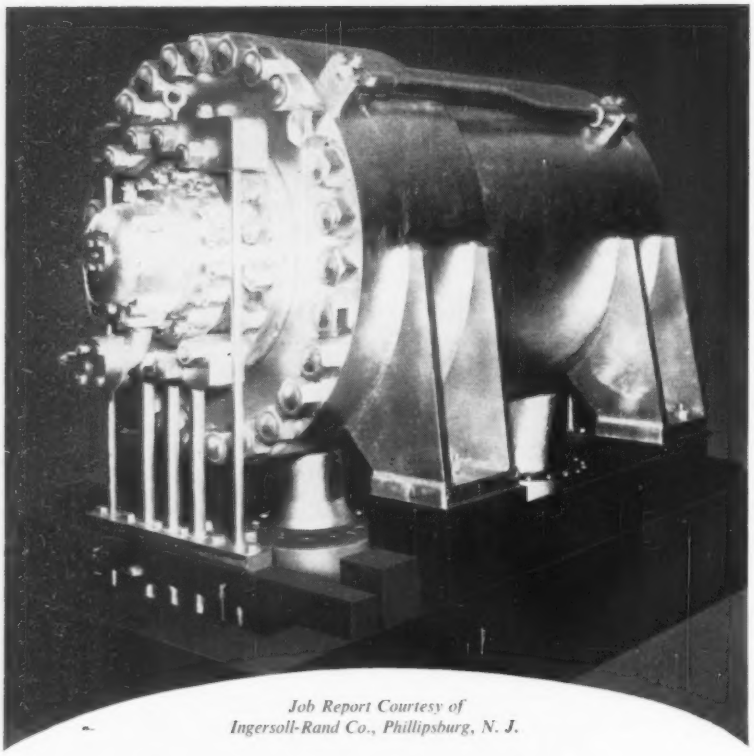
Our new 32-page **"Catalog 59"** illustrates a great variety of perforated metal patterns and gives complete working data. Also shows many modern industrial applications. Write for a free copy and let us quote on your requirements. When given sufficient information, our experienced engineers are often able to make money-saving suggestions—without charge or obligation.



Control Panel for Electric Range. We fabricate special panels or parts to any desired extent.

DIAMOND MANUFACTURING COMPANY
WYOMING, PENNA.
(WILKES-BARRE AREA)

Manufacturers of DIAMOND Perforated Metal Panels for Modern Acoustical Ceilings.



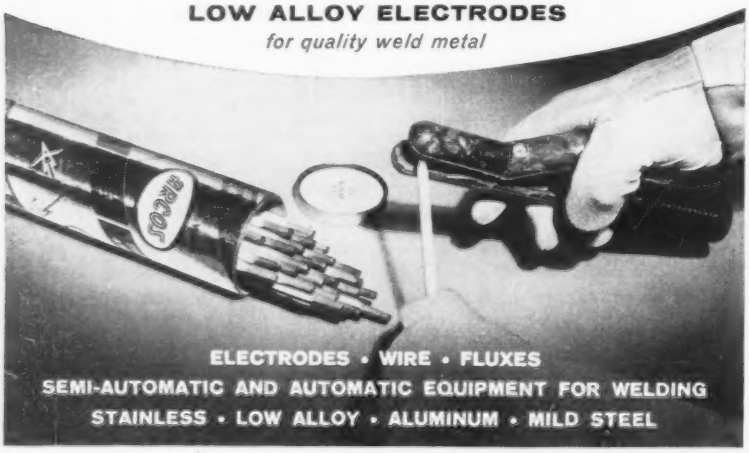
Job Report Courtesy of
Ingersoll-Rand Co., Phillipsburg, N. J.

When low alloy welds must withstand 2000 psi

This centrifugal compressor is one of many used in offshore gas repressuring. The pressure of nearly 2000 psi is nearly twice the highest former working pressure. Arcos Tensilend 70 Electrodes were used to produce the high strength welds required. When *you* need sound, high strength weld metal, use Arcos Low Alloy quality controlled electrodes for reliable performance.

WELD WITH ARCOS

LOW ALLOY ELECTRODES
for quality weld metal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SEMI-AUTOMATIC AND AUTOMATIC EQUIPMENT FOR WELDING
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NEW PRODUCTS and equipment

moves up or down with the mast.

The platform has 6 in. wheels in front and 4 in. swivel caster wheels in back. Long legs provide stability for the boom when fully extended and under load.

For further information, *write* Thern Machine Co., 3760 W. Fourth St., Winona, Minn.

Press Has Tooling Divided Into Separate Units

A COMBINATION multiple slide and transfer press cuts conventional tooling costs by as much as one-half. It offers economies to producers of small parts in job lot quantities. The unit comes in capacities of 3 and 9 tons. It can blank, pierce, form, and bend in one single continuous operation at speeds up to 100 strokes per minute.

Tooling is divided into separate units to cut costs on short run operations. Tolerances on finished parts are not dependent on accurate feeding of strip. The blank is separated from the strip at the first station and positively held for subsequent

operations. Toolholders are individually adjustable for height. Each tool, guide, and slide is accessible without disturbing the settings of adjacent stations (each stage is separate).

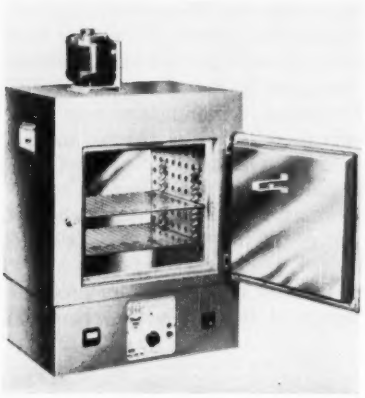
You can get a combined roll straightener and feed unit. It allows strip to be fed laterally. With this

unit, maximum feed of stroke for the 3 ton press is 3 in. and 5 in. for the 9 ton model.

For further information, *write* E. W. Bliss Co., 1375 Raff Rd. S.W., Canton 10, Ohio.

Miniature Batch Ovens Use Cycling Type Controls

MINIATURE batch ovens (Blue M) have 100 to 500° F temperature ranges. Inside dimensions are 19 x 18 x 17½ in. Over-all, the unit measures 43 x 30 x 29 in. It comes



equipped with on-off cycling type controls.

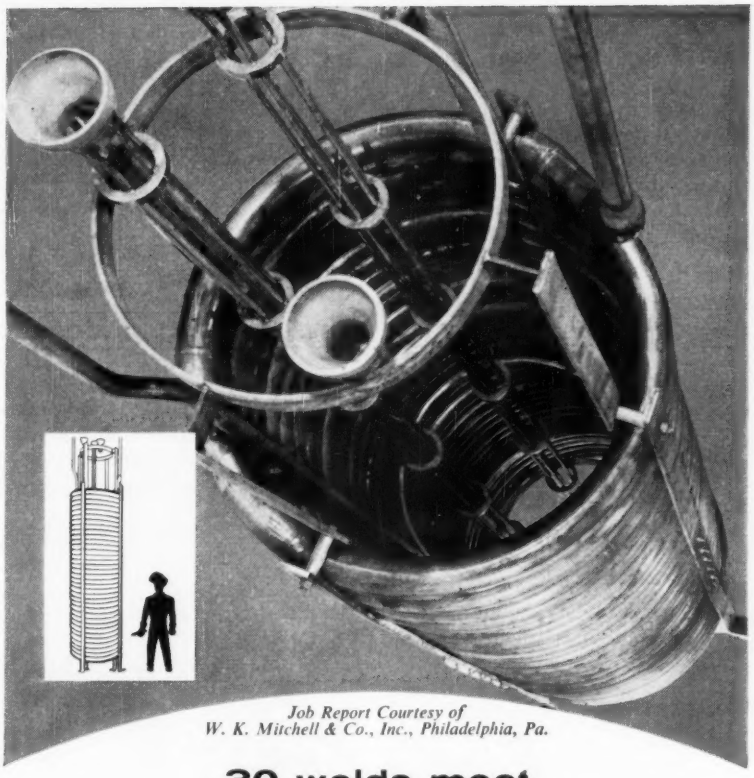
Straight line control is derived from a saturable, power reactor, control system without contacts, moving parts, or auxiliary mechanisms to wear, burn, or arc. There are no transient voltages due to arcing contacts.

Ovens in this series can process flat or odd shaped workpieces without special loading. Shielded, low watt, no thermal shock elements are mounted at the top of the work chamber.

For further information, *write* Blue M Electric Co., 138th and Chatham Streets, Blue Island, Ill.

Machine Does Short, Changeable Drilling

A MACHINE can handle a great variety of two spindle hole patterns in a wide range of parts. Up to 25 different shafts with different hole spacings or patterns can be accommodated. Only two sets of part



Job Report Courtesy of W. K. Mitchell & Co., Inc., Philadelphia, Pa.

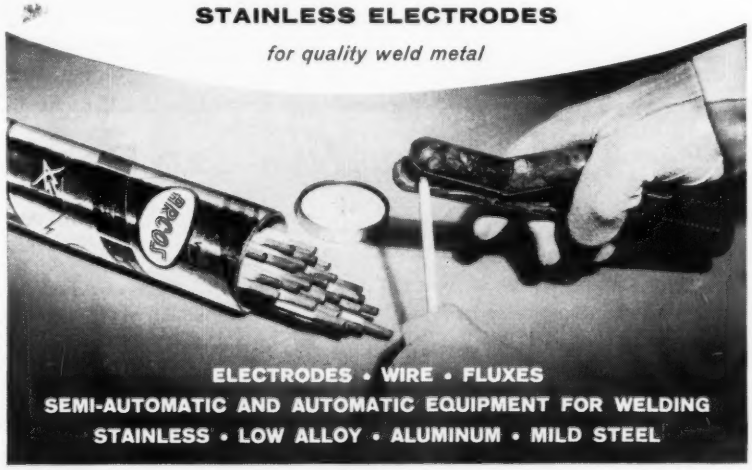
30 welds meet severe bending with no failures

Over 260' of Type 304L stainless tubing (3½" O.D. x 0.300" thick) was welded to form this coil assembly 17' high, 4' O.D. The job originally called for 10 welds. But because the fabricator had to accept random length tubing, 30 welds were required. Arcos Chromenar KLC Electrodes were used to assure needed corrosion resistance and high ductility. All welds met the bend perfectly.

WELD WITH ARCOS

STAINLESS ELECTRODES

for quality weld metal

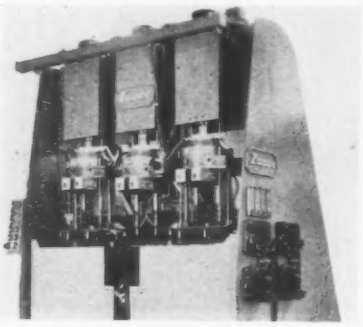


ELECTRODES • WIRE • FLUXES
SEMI-AUTOMATIC AND AUTOMATIC EQUIPMENT FOR WELDING
STAINLESS • LOW ALLOY • ALUMINUM • MILD STEEL

ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Pa.

fixtures and two sets of bushing plates are necessary. Both sets are equipped with adjustable bushings and part locators.

The unit has three stations equipped with adjustable spindle,



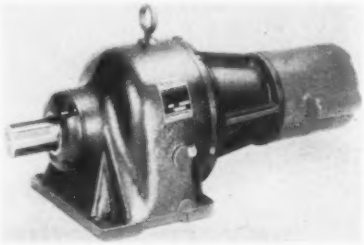
Zagar heads. The tapping station is in juxtaposition with drilling stations on the right and left. An air operated shuttle moves the two station, workholding fixture between the right drilling station and the left station. Between moves, tapping, load, and unload are done at the middle tapping station. One drilling station is idle during tapping, workhandling, and drilling (simultaneously) at the other two stations. A lead screw in the feed unit controls the feed of the tapping station.

For further information, *write* Zagar Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

Speed Reducers Come in Seven Motorized Models

A LINE of differential speed reducers (designated HM) has ratios from 1.1:1 to 50,000:1, and a maximum output torque range from 50 to 113,000 in.-lb. Horsepower ranges from 0.12 to 81.51.

A unified, helical gear, planetary element rides on an oil cushion between the planetary and internal gear teeth. The company says that regardless of gradual operating wear, it will automatically float into position and insure equalized load.



The units will fit standard C-flange motors and over-all dimensions of the individual models do not vary regardless of the reduction ratio.

For further information, *write* Winsmith Inc., 95 Eaton St., Springville, N. Y.

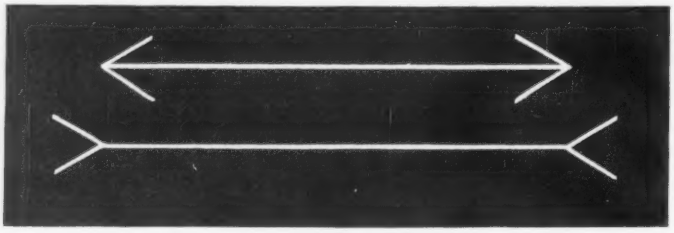
Co-ordinatograph Plotter Uses Tape or Card Input

AN AUTOMATIC co-ordinatograph plotter does precise layouts of grid systems and co-ordinate positions. Input can be punched tape or cards. Maximum operating speed is 3 in. per second. Slowest speed is 0.003 in. per second. It has encoder resolution to 0.001 in. The instrument's static, directly coupled system always retains a zero reference.

The unit can be used for precision layout of templates and charts, in

EXECUTIVE REPORT #24

APPEARANCES CAN BE DECEIVING



"Low-Price" Abrasives Can Be An Expensive Bargain

Measure the bars. The top one appears smaller, but it's not. Measure your present abrasive cost, and compare it with the proven low cost of Wheelabrator Steel Shot.

Don't be deceived by a low initial price. It's abrasive performance that gives true blasting economy . . . the lower abrasive consumption, faster cleaning, and lower maintenance enjoyed by users of Wheelabrator Steel Shot. Try it, and take a true measure of blast cleaning economy.

SEE THE PROOF IN YOUR OWN PLANT

Your Wheelabrator abrasive engineer will demonstrate the superior performance of Wheelabrator Steel Shot in your own plant. For data to help you control all your blast cleaning costs, write for Bulletin 905-D. Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ont.

WHEELABRATOR
STEEL ABRASIVES

aircraft lofting to scribe grids on metal or other drafting materials, to aid turbine blade design for printed circuit layouts, and resolution target production.

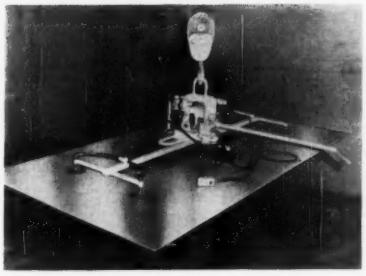
Working surface is 47¼ in. square. It has a plotting accuracy of ±0.0015 in.

For further information, *write* Aero Service Corp., 210 E. Courtland St., Philadelphia 20, Pa.

Vacuum Lift Device Handles Thin Metal Sheets

A UNIT with six vacuum pads is designed to handle and place ultra-thin stainless steel sheets on an insulating board. It eliminates costly manual handling which may produce crimping.

The unit is self-contained with the Powerpac mounted on a 48 in. beam with three 20 in. crossarms attached. Total rated capacity is 300 lb with a 2 to 1 safety factor. The Vac-U-Lift system can handle steel plates, tanks, concrete, structural steel, glass, and many other



nonporous materials.

For further information, *write* Vac-U-Lift Co., a division of Siegler Corp., Salem, Ill.

Two Models of Tapping Attachment Available

A TAPPING attachment for drill presses can be used on any material in diameters up to ½ in. Installation time is less than 1 minute. After tapping is completed, the attachment can be removed just as quickly.

Model 6100 has a straight shank and is held in the regular ½ in. drill press chuck. Model 6200 has a No. 2 Morse taper arbor for attachment directly to the drill press spindle. Model 6100 takes less installation time and is best for users who do only occasional tapping jobs. The other is recommended for permanent installations and where tolerances

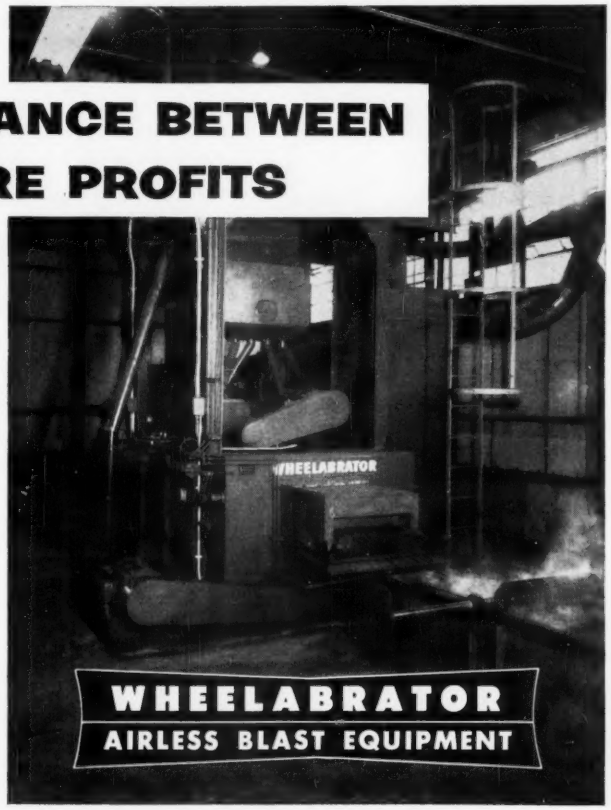
EXECUTIVE REPORT #25

THE SHORTEST DISTANCE BETWEEN STEEL ROD AND WIRE PROFITS

Wheelabrator® Straight-Line Cleaning, Patenting, Coating

At Leschen Wire Rope Division of H. K. Porter Co., Inc., 12 strands of hot-rolled rod go simultaneously through patenting, cleaning and coating in one continuous operation. Wheelabrator mechanical blast descaling is the essential step that makes this efficient processing possible. The blast descaling process eliminates the problems associated with acid pickling, and makes additional savings in time and labor costs.

This efficient production line operates continuously for 24 hours a day, 5 days a week without down time. Investigate the benefits you can realize with this new process for cleaning any type of ferrous or non-ferrous hot rolled rod and bar stock for cold drawn products. Write to Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.



are more critical.

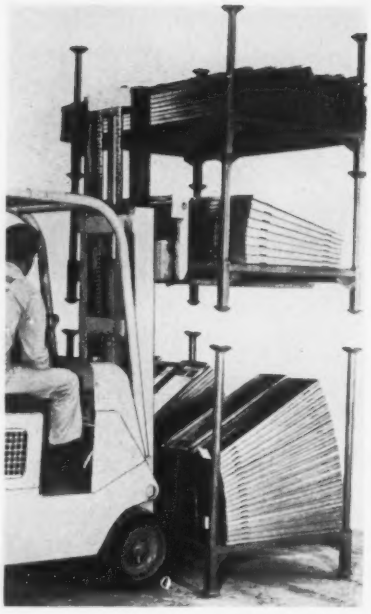
For further information, *write* Supreme Products Corp., 2222 S. Calumet Ave., Chicago 16, Ill.

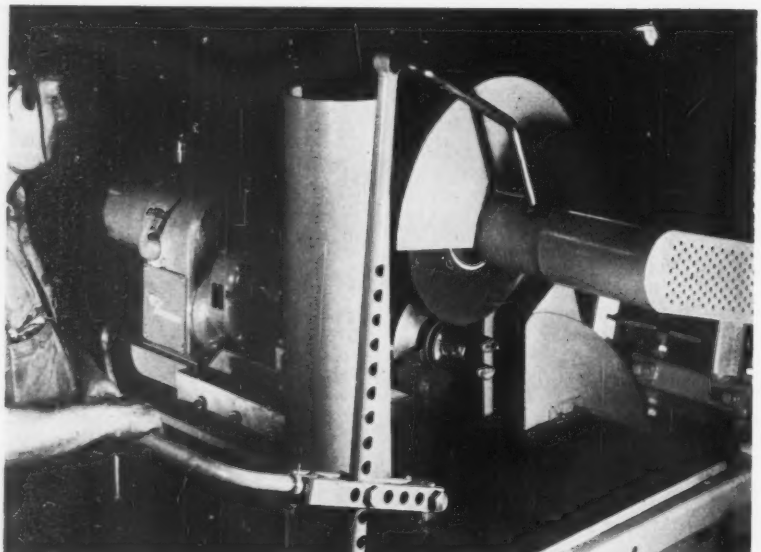
Pallets Handle Odd, Irregular Shapes

A MATERIAL handling unit, the Stack-On pallet, can handle irregularly shaped products and can be tiered, transported in groups, or stored.

The legs have no nuts, bolts, or fixtures. Both sizes (42 x 60 in. and 42 x 48 in.) have 4000-lb capacity

For further information, *write* Johnson-Flaherty, 5801 District Blvd., Los Angeles 22, Calif.





Unit Accurately Cuts Casting Risers

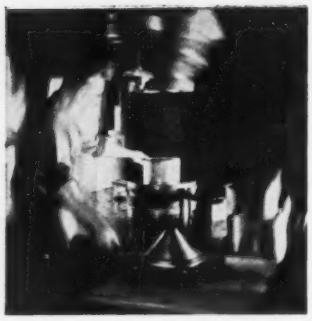
YOU can cut risers accurately and rapidly with the Roto-Trimmer.

Chuck capacity: Stainless steel rings 9 in. OD x ½ in. wall, or 6 in. solids.

It cuts three risers with 0.031 in. maximum corner radiuses of the cutoff surface. Chuck jaws are adjustable for ID and OD grip.

You can adjust the chuck laterally for up to 6 in. clearance from the index position (under cutting wheel). The rotator chuck and cutting spindle drives have separate starting switches. The unit has a 16 in. abrasive cutoff wheel. It's equipped with a 10 hp, 220 to 440 volt, 3 phase, 60 cycle motor with a variable speed rotator.

For further information, *write* Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago 14, Ill.



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Consistent Quality stainless steel takes the guesswork out of any production operation. Tooling set-ups become standard. Rejects and reworking are reduced. Your plant and your product move smoothly.

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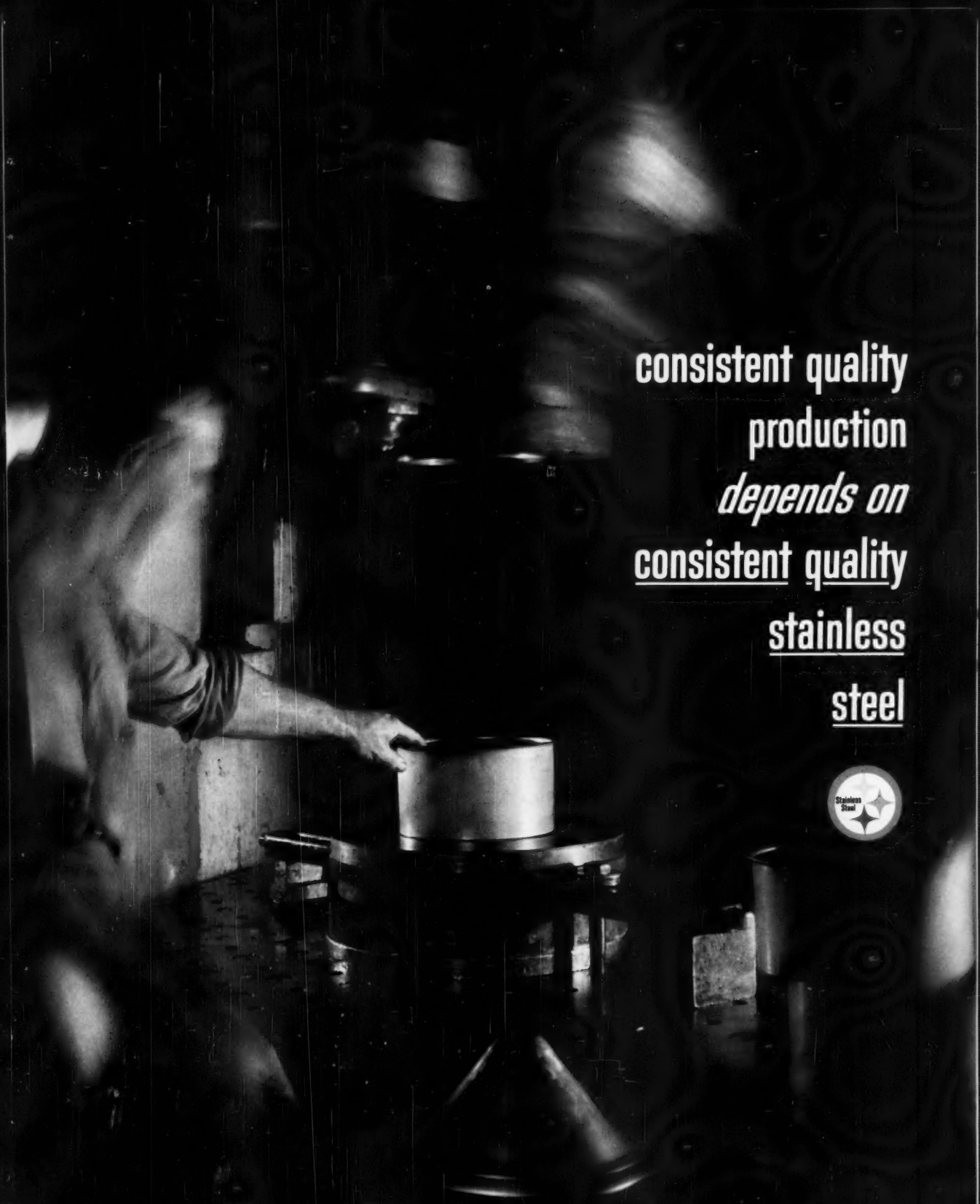

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depends on
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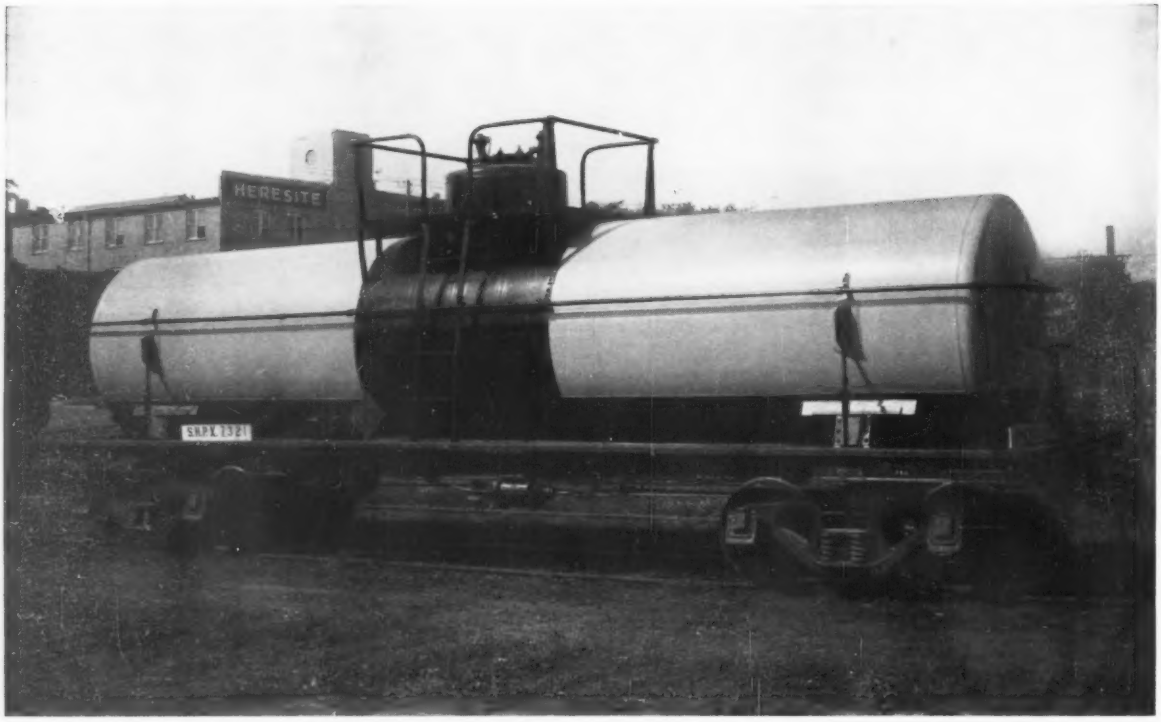
HERESITE

REG. U. S. PAT. OFFICE

TANK CARS LINED WITH HERESITE FOR HIGH RESISTANCE AND EASE OF CLEANING



Light colored HERESITE coatings are now available for tank car lining, and are of special interest for cars handling food products. These light colored linings as well as the familiar dark HERESITE linings are all made from *pure phenol-formaldehyde* resins long known for their superior qualities.

Since 1946 more than 2000 tank cars have been lined with HERESITE for the transportation of chemicals, food products, and other industrial commodities.

HERESITE & CHEMICAL COMPANY

Main Office & Plant—Manitowoc, Wisconsin

General Coating, Inc.—Woodbridge, New Jersey (subsidiary)

Canada: Dominion Rubber Company, Ltd.
Montreal, Quebec

Europe: Aluminium-Schweisswerk, A. G.
Schlieren-Zurich, Switzerland

NEW literature

Write directly to the company for a copy

Brazing Techniques

Brazing techniques on all commercial metals and alloys are presented in a 24 page illustrated manual. The manual details heat, torch setting, alloy selection, and joint design. Specific solutions to common brazing problems are answered in sections on copper, copper alloys, aluminum, cast iron, steel, and stainless steel brazing. All-State Welding Alloys Co. Inc., 249-55 Ferris Ave., White Plains, N. Y.

Storage Racks

A 28 page booklet points out the weaknesses of buying racking not designed to adequately sustain specific loads. It also discusses the economic and safety reasons for buying quality engineered racking. Paltier Corp., 1701 Kentucky St., Michigan City, Ind.

Applications for Tin

Detailed descriptions of some applications of tin appear in a 20 page booklet. It covers tin plate, solder, bronze, babbitt, white metals, tinning, tubes, chemicals, and miscellaneous alloys. Dept. P, The Malayan Tin Bureau, 2000 K St. N.W., Washington 6, D. C.

Wire Rope Catalog

Recommendations for the use of wire rope on construction and industrial machinery are contained in a 156 page book, "Wire Rope for Construction and Industrial Equipment." It also includes basic wire rope information and discusses special rope features, grades, constructions, lays, and cores. Specify Catalog 493. Publications Dept., Bethlehem Steel Co., Bethlehem, Pa.

Molybdenum Metal

Molybdenum is discussed in a 110 page booklet. It covers such things as applications, properties, corrosion, fabrication, production, lab techniques, and weight tables. A complete bibliography is given. Climax Molybdenum Co., a division of American Metal Climax Inc., 1270 Avenue of the Americas, New York 20, N. Y.

Columbium Alloy

A 30 page booklet discusses Du Pont D31 (80 per cent columbium, 10 per cent titanium, and 10 per cent molybdenum). Considerable data were developed in laboratories of Thompson Ramo Wooldridge Inc. in co-operation with Du Pont. Public Relations Dept., E I. du Pont de Nemours & Co. Inc., Wilmington, Del.

Silicate CO_2 Process

Binding of core and mold sands by the silicate CO_2 process is discussed in the July issue of *Silicate P's & Q's* (house organ of Philadelphia Quartz Co.). It reviews the early developments of the process and the principle of operation. It also reports on the recent attention given silicate CO_2 for ladle linings. Philadelphia Quartz Co., 1158 Public Ledger Bldg., Philadelphia 6, Pa.

Steel Weight Tables

A 72 page booklet contains weights of round, square, hexagon, octagon, and flat steel bars. In addition, decimal equivalents, tables of area, circumferences of circles, and other formulas are listed. Specify: Dyson Weight Table Booklet. Jos. Dyson & Sons Inc., 5125 St. Clair Ave., Cleveland 3, Ohio.

Ultrasonic Cleaning

Case history reports describe 12 standardized ultrasonic cleaning applications. They contain certified data from companies working with electronic parts, gyroscopes, ball bearings, subminiature relays, and vacuum tubes. Acoustica Associates Inc., 10400 Aviation Blvd., Los Angeles 45, Calif.

Computer Dictionary

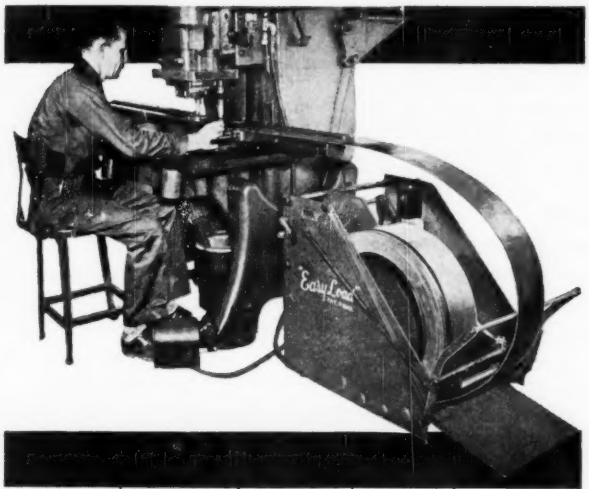
A pocket size, 22 page glossary, "Do You Talk Computerese," defines 82 terms. Industrial Div., Minneapolis-Honeywell Regulator Co., Wayne & Windrim Avenues, Philadelphia 44, Pa.

Investment Casting

A 4 page brochure describes a shell investment casting technique. Engineered Precision Casting Co., P. O. Box 68, Matawan, N. J.

reduce set-up time and lower production costs

WITH ROWE 800 SERIES *"Easy Load"* COIL CRADLES



MODEL	MAXIMUM CAPACITY WEIGHT	MAXIMUM WIDTH CAPACITY	MAXIMUM O.D. CAPACITY	FLOOR SPACE REQUIRED
810	1200#	10"	36"	15" x 30"
815	1200#	15"	36"	20" x 30"
820	1200#	20"	36"	25" x 30"
824	1200#	24"	36"	29" x 30"

When you are *in production* with ROWE "Easy Load" Coil Cradles, you are getting precision coil handling that reduces your set-up time and cuts your costs. Instant coil positioning by means of the adjustable side guide plus positive feeding action puts most materials exactly where it should be without underfeeding or overrunning. All 800 Series "Easy Load" Cradles can be moved from station to station by one man quickly and easily. They work equally well with manual or automatic feeding arrangements. Reduced-friction side guides pay off the coil without binding or scratching.

If you use coil stock for production items, the Rowe "Easy Load" 800 Series Cradle can increase the accuracy, efficiency and economy of your operation.

Investigate the complete ROWE line. Other equipment includes Coil Cradles to 20,000 pound capacity, Straightening machines, Straightening and Feeding Machines, Cabinet Feeds, Roll Feeds, Coil Catchers and Storage Ramps, Combination Cradle and Straightening Machine Units, Coil Buggies, Reels, Conveyors, Stackers and Complete Sheeting Lines.

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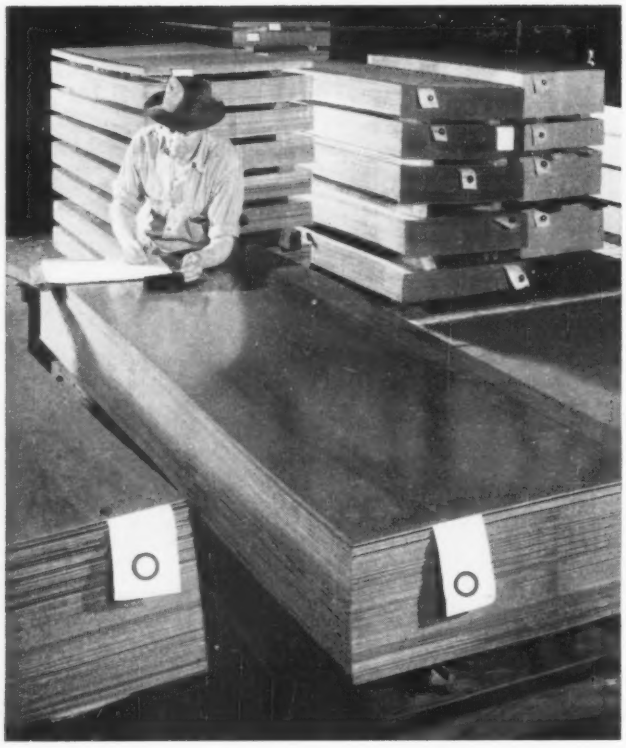

When your inventory becomes unbalanced and sudden spot requirements develop, Acme-Newport's *Red Circle Service* can help you. Under this plan every copy of your rush order is stamped with a brilliant red circle, signaling all departments to give it immediate attention. Your order is expedited through every operation, just as you yourself would schedule it.

Such efficient service is facilitated at Acme-Newport by their unusual combination of 76 years' experience, modern equipment, flexibility, conscientious personnel. And economical Waterail-truck routes provide convenient delivery throughout the entire Middle West and South. We'll be glad to discuss your specific requirements for any of the products listed at the left.

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Hot Rolled Steel in Coil
Hot Rolled Pickled Steel in Coil
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Alloy Sheets and Plates
Plates ($\frac{5}{16}$" *and lighter*)
Electrical Sheets
Electric Weld Line Pipe
Spiral Welded Pipe

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

Outlook for Auto Steel Is Good

LOOK for automakers to bring out their 1961 models on schedule and to produce almost as many cars this quarter as they originally programed.

Despite their requests that August steel shipments be delayed for a week or two, they're not making any big changes in their plans. They'll build about 460,000 cars this month and 280,000 in August, when most of the model changeovers will take place. The cutbacks will probably be made in September production of new cars—although it's possible that final runs on 1960 models will be curtailed. One of the Big Three has reportedly cut its preliminary program for third quarter output of 1961 models by 10 per cent. That may well be the pattern for the industry.

THE UNSOLD MILLION— Decisions to trim auto output are being made because of the inventory situation. About 1 million unsold cars are in dealers' hands or in transit. Automakers would like to see the supply of unsold 1960 cars cut to about 400,000 by the time new models are introduced—but there's little chance that the reduction will be that great.

The automakers normally favor high inventories. For most of the model run, they gear their production to retail sales so that dealer stocks won't shrink. Reason: With big inventories to worry about, dealers sell hard and discount heavily to keep cars moving.

In Detroit, Ford Motor Co. has reportedly been pointing an accusing finger at General Motors Corp.—saying that GM has gone overboard with the big inventory theory and has kept high volume production up too long.

UPTURN IN AUGUST?— Because of the planned slowdown, purchasing agents in the auto industry are telling steelmen that they'll have to wait a little longer for orders. Hot rolled sheets to be used in frames won't be needed this month. They're to be delivered in August. Although small tonnages are being shipped to the automakers now, the big orders for steel of all types won't be released until the latter part of next month.

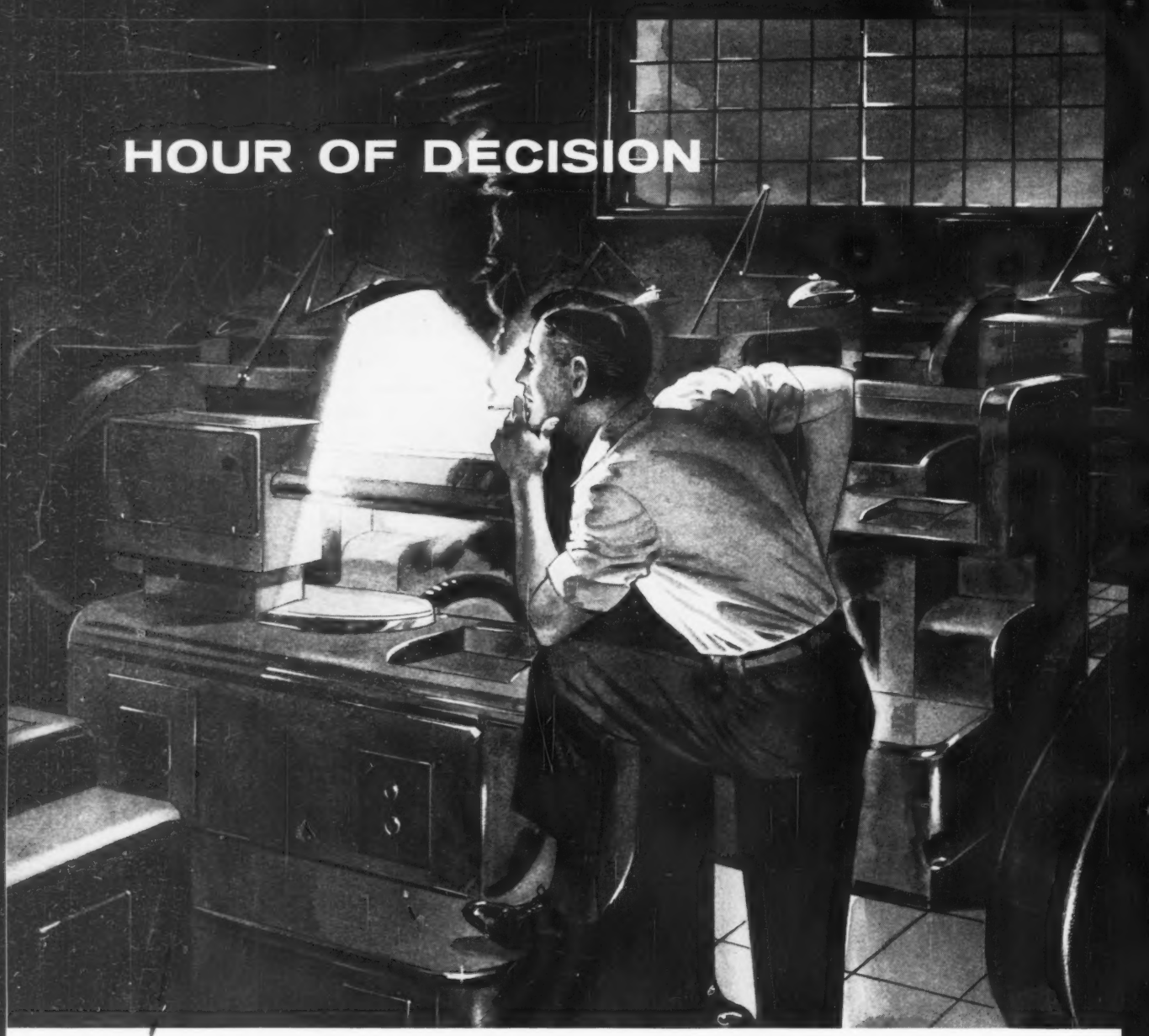
PRODUCTION REBOUNDS— Last week, steelmaking operations rebounded from the year's low point (42.2 per cent of capacity) to a slightly more robust 53.1 per cent. Production was about 1,513,000 ingot tons. Unfortunately, the rising output wasn't accompanied by significant gains in order entry, so it's unlikely that operations will go much higher this month. Since steel is being produced at about the same rate that it's being ordered, any pickup in demand will be quickly reflected in output. Next month, orders may reach a volume that would support production at 70 per cent of capacity. The ingot rate probably won't go that high until September.

TUBEMAKERS UP DISCOUNTS— Hoping to increase their sales, steelmakers have upped the jobber's discount on pipe from 3 to 5 per cent. Explaining the move, F. A. McClelland, vice president-sales, Wheeling Steel Corp., commented: "The same wholesalers and jobbers who handle our pipe also handle substitute materials—such as brass, copper, and plastics—and compete with imported steel pipe and foreign substitute piping materials. Our previous discount has not adequately compensated them to meet this competition." In the first five months of this year, 258,000 tons of pipe and tubing were imported—56 per cent more than the 165,000 tons that came into the U. S. during the same period of '59.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	128	133
Reinforcing	128	134
Boiler Tubes	...	136
Canada	...	*
Charts:		
Finished Steel	...	131
Ingot Rate	130	...
Scrap Prices	...	143
Clad Steel	...	137
Coal Chemicals	...	139
Coke	...	139
Comparisons	...	131
Contracts Placed	129	...
Contracts Pend.	129	...
Electrodes	...	139
Fasteners	...	136
Ferroalloys	...	140
Fluorspar	...	139
Footnotes	...	136
Imported Steel	...	139
Ingot Rates	130	...
Metal Powder	...	139
Nonferrous Met.	146	148
Ores	...	139
Pig Iron	149	138
Piling	...	133
Plates	149	133
Plating Material	...	149
Prestressed Strand	...	136
Price Indexes	...	131
Producers' Key	134	...
R.R. Materials	...	136
Refractories	...	139
Scrap	143	144
Semifinished	...	133
Service Centers	150	138
Sheets	128	134
Silicon Steel	...	135
Stainless Steel	...	137
Strip	128	135
Structurals	129	133
Tin Mill Prod.	...	135
Tool Steel	150	137
Tubular Goods	150	137
Wire	129	135

*Current prices were published in the July 11 issue and will appear in subsequent issues.



IS THIS YOU? How many times, after the call bell stops clanging, the customers stop phoning, and people stop asking questions, do you walk into the quiet shop to face up to the really vital decisions?

"How can we compensate for the rising costs of materials, overhead, payroll, maintenance?" "How can we keep producing the exacting tolerances, finishes, and quality our markets are demanding?" "How can we improve our production efficiency so that our narrow profit margin will not disappear altogether?" "How can we meet and beat the increasing world-wide competition in our field?"

One proved answer to these questions is the logical replacement of obsolete, inefficient machines. THE MACHINE TOOL EXPOSITION — 1960 will back up this fact with 11 acres of the latest developments in machine tools. Can you afford to miss seeing new, faster machine tools that will produce more efficiently . . . new, better methods that will cut satisfying chunks out of metalworking costs . . . new, ingenious ideas that will help you produce more quality for less cost?

Tool-up for the Sixties. Plan *now* to attend the largest, single-industry exposition ever held in the United States. Have your key personnel on hand, too. It's a once in five years chance to examine the latest technological advancements in automation through numerical controls and see why Modern Machine Tools = Production Efficiency!

Also see the PRODUCTION ENGINEERING SHOW on the Navy Pier. One registration covers both.

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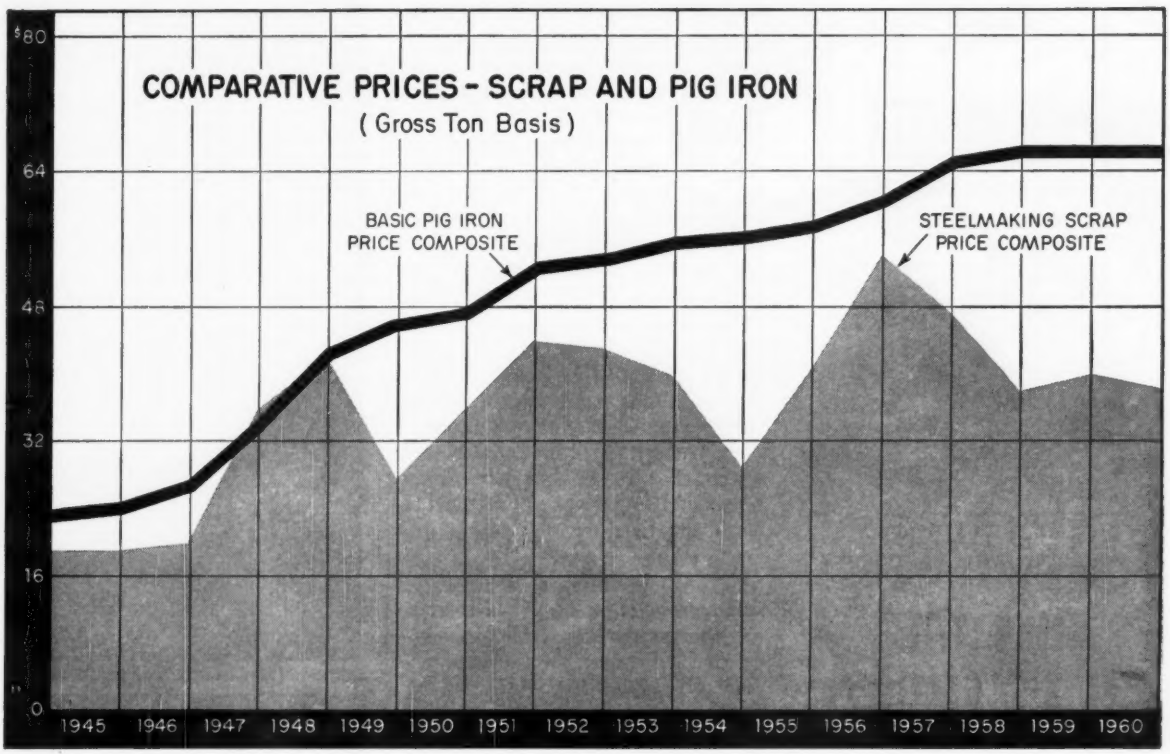
Scrap Firms Resist Standby Status



SCRAPMEN are worried and puzzled as their market narrows, and prices sink to the lowest level in six years.

Epitomizing the trade's perplexity is the question posed by Benjamin Schwartz (Benjamin Schwartz Co. Inc., New York) at a recent yard dealers' conference:

"In the face of fantastic plans for expansion of the steel industry in the next 20 years, what is denying us (the scrap trade) the opportunity to share in this future to the maximum of our potential?"

He went on: "It seems all we have learned, and have lived by in our industry for more than 50 years, is now open to question. We were taught when scrap prices were low enough, scrap would be attractive, but even this last comfort has been denied us."

• That dealer scrap is at a crossroads is recognized by even those only remotely acquainted with the market situation.

The industry is undergoing tremendous structural, financial, and production changes, and the end is not in sight. Dealer material is moving in small volume. Except for exports, and domestic demand for a few specialties, the market has virtually disappeared. Apprehension is rising that the industry may be nearing standby status in the economy.

About the only really bright market spot in recent months has been provided by exports. Coastal interests, including some in the Great Lakes area (now open to world trade through the St. Lawrence Seaway), are the chief beneficiaries. Recently, it was reported 30,000 tons of Detroit area scrap was contracted for by European consumers. Latest data show national exports are running at an annual rate well in excess of the 4.2 million tons shipped abroad last year.

Years ago, the average scrap dealer had 65 per cent of his assets in cash. Today, 65 per cent is tied up in equipment, land, and buildings. The industry is changing from a simple trading function into a complex processing activity.

• But the scrap processor is finding himself in an increasingly unfavorable position.

This isn't an overnight phenomenon—or a nightmare that'll soon fade away. It's been in the making for years, particularly since 1956 when purchased scrap consumption hit peak. That year, scrap use totaled 71.7 million gross tons (home produced, 36.6 million; purchased, 35.1 million). Last year, consumption (curtailed by the steel strike) amounted to 60.8 million tons (home produced 33 million; purchased, 27.8 million).

The ratio of scrap to pig iron in furnace melts (all types) last year was 52.6 per cent to 47.4. That compares with 51.7 for scrap and 48.3 for pig iron (hot metal) in 1956. The gain for scrap was entirely in favor of home produced

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material. The ratio in April, this year, was 49 per cent scrap, 51 per cent pig iron.

• Abnormal market conditions last year make statistical comparisons for 1959 suspect as an accurate indicator.

Still, the year's showing bears out the long term trend, the use gap between purchased scrap and home produced scrap having tended to widen in favor of the latter over the last decade. In 1950, for example, home scrap's advantage amounted to 2.6 million tons. Last year, it was 5.2 million, double that ten years ago.

Dealer scrap's long term decline stems from a combination of technological and economic developments in the steel industry—developments over which the scrapmen have had little control and which, in general, they have been surprisingly slow to counter with effective defensive action.

Those developments include: 1. Improved steelmaking technology, such as oxygen melting which steps up the production cycle tremendously. 2. Greater blast furnace capacity, making more hot metal available for steelmaking at the expense of purchased scrap. 3. Increased flexibility of the steel industry in the use of scrap as opposed to hot metal (some mills reportedly have been charging open hearths with 70 per cent hot metal). 4. Larger production of home scrap and diversion of industrial scrap direct to the mills, bypassing the dealers.

Factors more immediately affecting the market are: 1. Abnormally heavy stocks in consumers' hands (8.2 million gross tons at the end of April). 2. Slumping steelmaking operations in the second and third quarters. 3. Mixed business outlook and political uncertainty for the months ahead.

• The dealer scrap business has historically been highly speculative in character.

Today, a new marketing approach is needed, with consumers pressing for stability comparable to that in the iron ore and pig iron markets. Stability permits long term contracting, a desirable procurement requisite in the steel industry.

(Sharp fluctuations in the scrap

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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price trend line over the last 15 years provide a striking contrast to the relatively steady trend line for pig iron, though pig iron registered a much greater long term increase than scrap in the period. See chart on Page 125.)

Aware of their increasingly vulnerable position, scrapmen are moving to prevent further deterioration of their standing as suppliers to the steel industry. They are paying more attention to such aspects of their business as quality, delivery, and preparation.

• An intensive research program is being promoted in association with the steel industry.

This aims at increasing knowledge of the metallurgical and chemical aspects of No. 2 bundles (a leading dealer grade of scrap), at providing more information leading to a standardized product and greater quality, at developing realistic cost control in processing yards, and improving mill inspection practices.

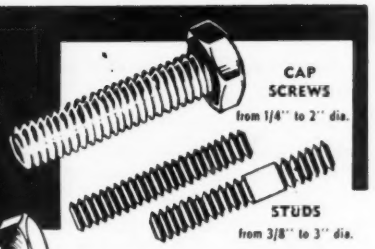
Informed scrapmen think use of dealer scrap is bound to increase as time passes. As a "mine above ground," the annual scrap crop provides a mighty hedge in the conservation of the nation's irreplaceable natural resources in iron ore, coal, and limestone.

For every ton of scrap used in steelmaking, 2 tons of ore are conserved.

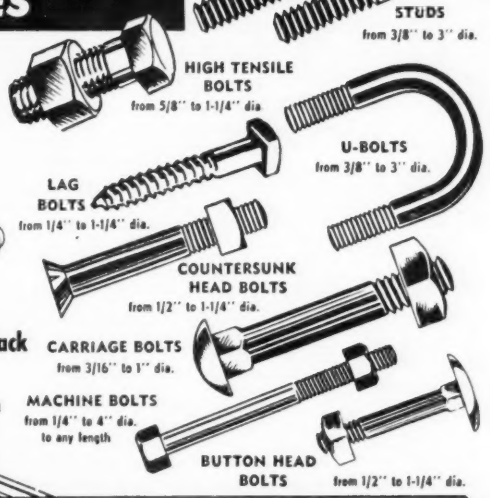
Even technological changes in steelmaking may eventually work out to the advantage of scrap. For instance, the recently announced Ford Motor Co. oxygen melting process (with potential for doubling open hearth steel output) works equally well on a furnace charge of 70 per cent scrap and 30 per cent hot metal as on the standard 50-50 mix.

Leading scrap processors think their industry will contract into fewer, but larger, processing yards, with small collectors continuing pretty much as at present. Medium size yards, it's thought, will probably be the most severely squeezed, as economic forces effect a realignment within this $2 billion (gross sales) industry, and the traditional speculative motive in the business gives way to a more realistic marketing concept, leading to a relatively high degree of price stability.

INDUSTRIAL FASTENERS and FASTENER SPECIALTIES



Immediate delivery...



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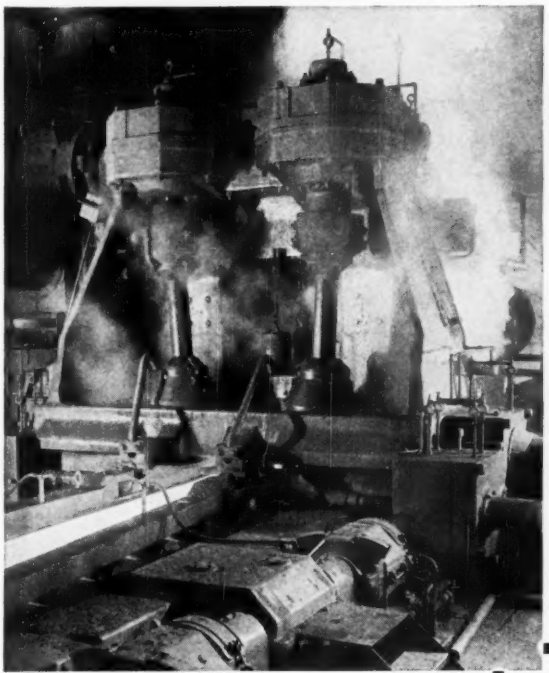

Edging hot strip steel

No place for second-best equipment. That's why this heavy-duty vertical overdrive edger uses rugged Cone-Drive **double-enveloping worm** gearing to drive the vertical rolls continuously.

Rugged Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

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Sheets, Strip . . .

Sheet & Strip Prices, Pages 134 & 135

With the low point in demand apparently past, sheet steel business appears to be a shade more active at some points, but sales are slow and some order cutbacks and shipment deferments are still being received by the mills, notably from appliance makers seeking to balance their production with sales and reduce their big inventories of finished goods.

Despite the continued sluggishness, the low point is believed certain to have been hit this month. Automotive needs for the 1961 models are expected to spark recovery from here on, though hopes that the car builders will get a fast start on the new models are being dashed by requests from several builders to delay steel shipments scheduled for August by a week or two. It's thought the car manufacturers may be modifying their production schedules because of large inventories of 1960 model cars in the hands of dealers.

"All exposed and unexposed surfaces shall be of STAINLESS STEEL..."

Cafeteria and Executive Kitchen, *Continental Grain Co.*, Offices: New York City. Designed by *Designs for Business, Inc.*, New York, N. Y. Fabricated by *Stainless Food Equipment Co.*, Newark, N. J. Installed by *Ben Mernit*, New York City

■ The specifications for this executive cafeteria called for all kitchen metal surfaces, both exposed *and* unexposed, to be constructed of stainless steel. Only *lifetime* stainless steel can offer the durability and ease of maintenance necessary for maximum sanitation in food handling.

■ MICROROLD STAINLESS STEEL was chosen for its consistent uniformity of gauge, outstanding finish and well-known fabricating qualities.

■ *Why not investigate the advantages of stainless steel for your next project?*

WASHINGTON STEEL CORPORATION

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Shipments of hot rolled sheets are available in two to three weeks, cold rolled in three to four. Promises on galvanized run close to four weeks but can be better in some instances. Enameling stock and electrical sheets can be had in three to four weeks.

Some Steel Products Buck Downtrend in Shipments

May shipments of steel products from mills totaled 6,272,432 net tons vs. 6.7 million in April, reports the American Iron & Steel Institute. Total shipments in the first five months came to 36.9 million tons, down about 3 per cent from the 38.2 million shipped in the same period of 1959.

Sheet and strip shipments, however, set a first-five-months record at 15.1 million tons, a gain of 207,000 over the former high set last year. Shipments of plates, at 3.4 million tons, showed a 264,000 ton increase over the January-through-May 1959 total. Over the same period, shipments of heavy structural shapes increased 252,000 tons to 2.5 million. Rails and accessories, along with semifinished steel products also showed increases.

Here are comparative mill shipments to leading market classifications in first five months:

	5 Months, 1960 tons	5 Months, 1959 tons
Automotive	7,549,177	8,180,100
Distributors	6,726,475	6,961,779
Construction ...	4,689,792	4,835,595
Containers	3,191,504	3,644,879
Machinery, etc..	2,234,110	2,308,746

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 134

Some reinforcing bar fabricators in the Midwest report that their backlogs are the highest in history. Generally, business is considered good by most shops. Competition continues keen, especially from imported bars.

Steel Bars . . .

Bar Prices, Page 133

Hot rolled carbon steel bars are available for delivery in two to three weeks, and hot rolled alloys (as rolled) can be had in three to four weeks. Hot alloys are moving a little faster than hot carbon bars, reflecting a modest volume of automotive specifications.

For the same reason, cold drawn

alloy bars are a shade more active than hot rolled or cold drawn carbon material. However, both cold drawn carbon and alloy bars can be had for nearby shipment. Cold drawn carbon bars, in some instances, are available from stock.

Wire . . .

Wire Prices, Pages 135 & 136

Manufacturers' wire is available for shipment within three to four weeks, while merchant wire items can be had from stock.

Wire mills in the East, notably those producing drawn specialties, are experiencing difficulty in scheduling uneven and small orders economically. That's the situation with both integrated mills and converters.

Structural Shapes . . .

Structural Shape Prices, Page 133

Structural steel fabricators are still drawing on their order backlogs to sustain shop operations. Competition for new work continues keen. Inquiry has picked up slightly. In the East, for example, a flurry of Pennsylvania highway projects is giving the market a lift. Eastern awards include 7350 tons for a Washington stadium.

A little more bridge tonnage is being estimated in New England, the bulk of it composite stringer and beam spans.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7350 tons, District of Columbia stadium, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; McCloskey & Co., Philadelphia, is general contractor; also required, 56 tons of reinforcing bars and 53 tons of piling.

400 tons, Willamette River bridge, Oregon; reported placed with Western Steel Co., Salt Lake City, Utah; S. & D. Construction Co., Portland, Oreg., general contractor.

400 tons, Weyerhauser pulp mill addition, Longview, Wash., to Pacific Car & Foundry Co., Seattle; L. H. Hoffman Co., Portland, Oreg., general contractor.

295 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Knoxville Iron Co., Knoxville, Tenn.

211 tons, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Phoenixville, Pa.

160 tons, office addition, American Home Foods, Milton, Pa., to Milton Steel & Supply Co., Milton.

150 tons, substation structures, Metropolitan Edison Co., Portland, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

4583 tons, state bridgework, Washington-Fayette counties, Pennsylvania; bids July 29; also required, 450 tons of reinforcing bars.

1652 tons, state bridgework, Allegheny County, Pennsylvania, bids Aug. 5; also required, 1128 tons of reinforcing bars.

1748 tons, state bridgework, Washington County, Pennsylvania, bids Aug. 5; also required, 1128 tons of reinforcing bars.

707 tons, state bridgework, Berks County, Pennsylvania, bids July 29; also required, 352 tons of reinforcing bars.

550 tons, state bridgework, Northampton-Carbon counties, Pennsylvania, bids July 29; also required, 919 tons of reinforcing bars.

405 tons, state bridgework, Cumberland County, Pennsylvania, bids July 29; also required, 200 tons of reinforcing bars.

379 tons, angles, General Stores Supply Office, Navy, Philadelphia; bids July 20.

265 tons, channels, General Stores Supply Office, Navy, Philadelphia; bids July 25.

357 tons, angles, General Stores Supply Office, Navy, Philadelphia; bids July 19.

324 tons, state bridgework, Fayette-Westmoreland counties, Pennsylvania, bids Aug. 5; also required, 314 tons of reinforcing bars.

200 tons or more, McNary Dam gates; bid date advanced to July 20 to the U. S. Engineer, Portland, Oreg.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1550 tons, subway under Seattle-Tacoma airport runway, to Soule Steel Co., Seattle; Ostruske-Murphy Co. Inc., Tacoma, Wash., general contractor.

257 tons, addition to Providence Hospital, Anchorage, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Patti-MacDonald Co., Seattle, general contractor.

192 tons, East Anchorage, Alaska, high school, to Pacific Coast Div., Bethlehem Steel Co., Seattle; H. S. Lease Co., Seattle, general contractor.

115 tons, Washington State, Pierce County freeway underpass, to Northwest Steel Rolling Mills Inc., Seattle; Allen R. Anderson, Seattle, general contractor at $248,257.

REINFORCING BARS PENDING

1128 tons, state bridgework, Washington County, Pennsylvania, bids Aug. 5; also

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required, 1748 tons of structural steel.

1112 tons, state bridgework, Allegheny County, Pennsylvania, bids Aug. 5; also required, 1662 tons of structural steel.

919 tons, state bridgework, Northampton-Carbon counties, Pennsylvania, bids July 29; also required, 550 tons of structural steel.

450 tons, state bridgework, Washington-Fayette counties, Pennsylvania, bids July 29; also required, 4583 tons of structural steel.

352 tons, state bridgework, Berks County, Pennsylvania, bids July 29; also required, 707 tons of structural steel.

314 tons, Fayette-Westmoreland counties, Pennsylvania, bids Aug. 5; also required, 324 tons of structural steel.

249 tons, state bridgework, Berks County, Pennsylvania, bids Aug. 5.

235 tons, Washington State, two girder bridges, Pierce County; bids to Olympia, Wash., July 26.

293 tons, state bridgework, Washington County, Pennsylvania, bids July 29.

125 tons, Washington State, girder bridge in Okanogan County; bids to Olympia, Wash., July 26; also, 50 tons in Grant County.

PLATES . . .

PLATES PLACED

227 tons, hull steel, alloy, General Stores Supply Office, Navy, Philadelphia, to Colorado Fuel & Iron Corp., Claymont, Del.

500 tons (estimated), 1290 ft penstock, Eugene, Oreg., power project, to Graver Tank & Mfg. Co., Provo, Utah, low at $292,958.

PIPE . . .

CAST IRON PIPE PLACED

855 tons, 4 to 12 in., for Auburn, Wash., to U. S. Pipe & Foundry Co., Seattle.

110 tons, 8 in. for Bremerton, Wash., to U. S. Pipe & Foundry Co., Seattle.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chicago, Rock Island & Pacific, 25 baggage cars to the St. Louis Car Co., St. Louis.

First Half Steel Output Third Highest on Record

Steel production in June, 7,394,000 net tons, brought production for the second quarter of the year to 26,002,329 tons, and for the first half to 60,743,222 tons. It was the third highest six months on record, reports the American Iron & Steel Institute.

The first half total compared with the record 64,278,203 tons in the like period of 1959 and with 62,607,172 in the first half of 1956.

Output in the second quarter was about 8.7 million tons below that of the preceding three months and about 7.8 million under that in the comparable period of 1959.

June production compared with 8,830,472 tons in May, and 10,907,634 in June last year.

The institute's index of steelmaking for the first half (in terms of average production in 1947-49) was 145.4. That compared with 154.8 for the first half of 1959. The index for the second quarter was 124.5 vs. 166.4 for the first quarter and 161.8 for the second quarter, 1959. The June index was 107.4 vs. 124.1 in the preceding month and 158.4 in June, 1959.

Operations in June averaged 60.6 per cent of capacity compared with 70 per cent during May. The average for the second quarter was 70.2 per cent vs. 93.8 the preceding quarter, while the average for the first half was 82 per cent.

Steel Ingot Production — June, 1960

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	95.5
February ...	9,715,527	215,263	245,458	949,558	11,126,806	94.3
March	10,103,122	202,812	306,741	952,008	11,564,683	91.6
1st Qtr	30,329,265	630,207	833,180	2,948,241	34,740,893	93.8
April	8,603,806	105,336	302,763	766,452	9,777,857	80.1
*May	7,844,140	73,010	309,505	603,817	8,830,472	70.0
†June	6,439,000	80,000	315,000	560,000	7,394,000	60.6
†2nd Qtr ..	22,886,446	258,346	927,268	1,930,269	26,002,329	70.2
†1st Half...	53,215,711	888,553	1,760,448	4,878,510	60,743,222	82.0
1959						
January ...	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February ...	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo. ..	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
July	4,541,741	66,433	98,634	525,368	5,232,176	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September ..	1,249,398	.....	.....	285,619	1,535,017	12.7
3rd Qtr	6,962,481	66,433	98,634	1,078,922	8,206,470	22.1
9 Mo.	63,524,314	1,082,256	1,453,093	6,425,010	72,484,673	65.6
October	1,385,490	.....	.....	319,043	1,704,533	13.6
November ..	6,290,659	92,361	129,794	754,793	7,267,607	59.9
December ..	10,468,534	205,666	281,451	1,033,668	11,989,319	95.6
4th Qtr	18,144,683	298,027	411,245	2,107,504	20,961,459	56.3
2nd 6 Mo...	25,107,164	364,460	509,879	3,186,426	29,167,929	39.2
Totals	81,668,997	1,380,283	1,864,338	8,532,514	93,446,132	63.3

Note—The percentages are based on annual capacities as of Jan. 1, 1960: Open hearth, 126,621,630 net tons; bessemer, 3,396,000 net tons; basic oxygen process, 4,157,400 net tons; electric and crucible, 14,395,940 net tons. Total: 148,570,970 net tons. In 1959, the capacity tonnages were: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons.
†Preliminary. *Revised.

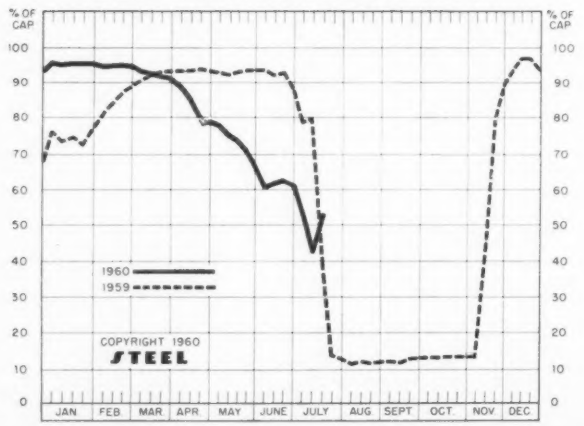
DISTRICT INGOT RATES

(Percentage of capacity utilized)

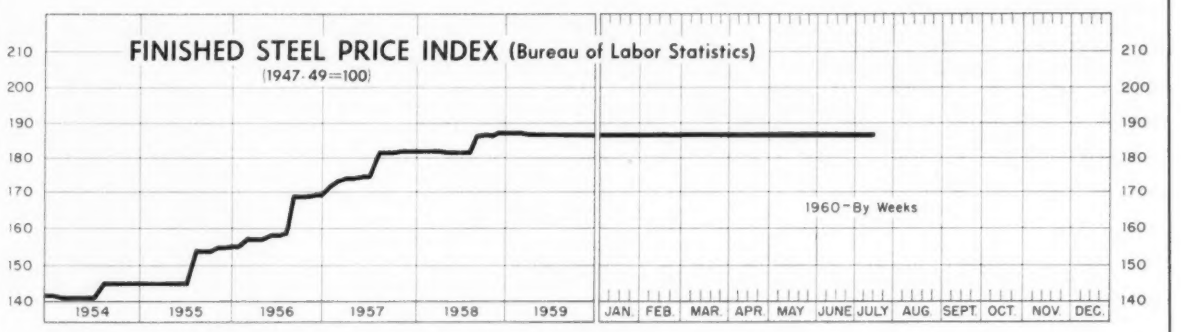
	Week Ended July 17	Week Ago	Month Ago	Year Ago
Northeastern	59	50	69	*
Buffalo	54	48	60	*
Pittsburgh	45	35	60	*
Youngstown	32	13	42	*
Cleveland	46	42	66	*
Detroit	83	70	82	*
Chicago	60	46	64	*
Cincinnati	51	26	63	*
St. Louis	52	52	74	*
Southern	64	42	65	*
Western	61	64	69	*
Total Industry..	53.1	42.2	62.3	38.7
Index ..... (1947-49=100)	94.2	74.9	110.5	68.3
Net Tons ..... (In thousands)	1,513	1,203	1,775	1,097

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



July 12, 1960	Week Ago	Month Ago	June Index	Year Ago
186.2	186.2*	186.6	186.6	187.7

*Revised.

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 12

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.493
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.433
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	195.398
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed(80-rod spool)	8.414
Woven Wire Fence (20-rod roll)	20.003

STEEL'S FINISHED PRICE INDEX*

	July 13 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	207.63
Index in cents per lb	6.713	6.713	6.713	6.713	5.625

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$126.64
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	31.67	31.33	31.33	38.67	38.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	July 13 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.50
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.317
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35-6.45
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin plate (1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton

	July 13 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	56.16
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	59.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.),deld.,Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tonst	245.00	245.00	245.00	245.00	190.00

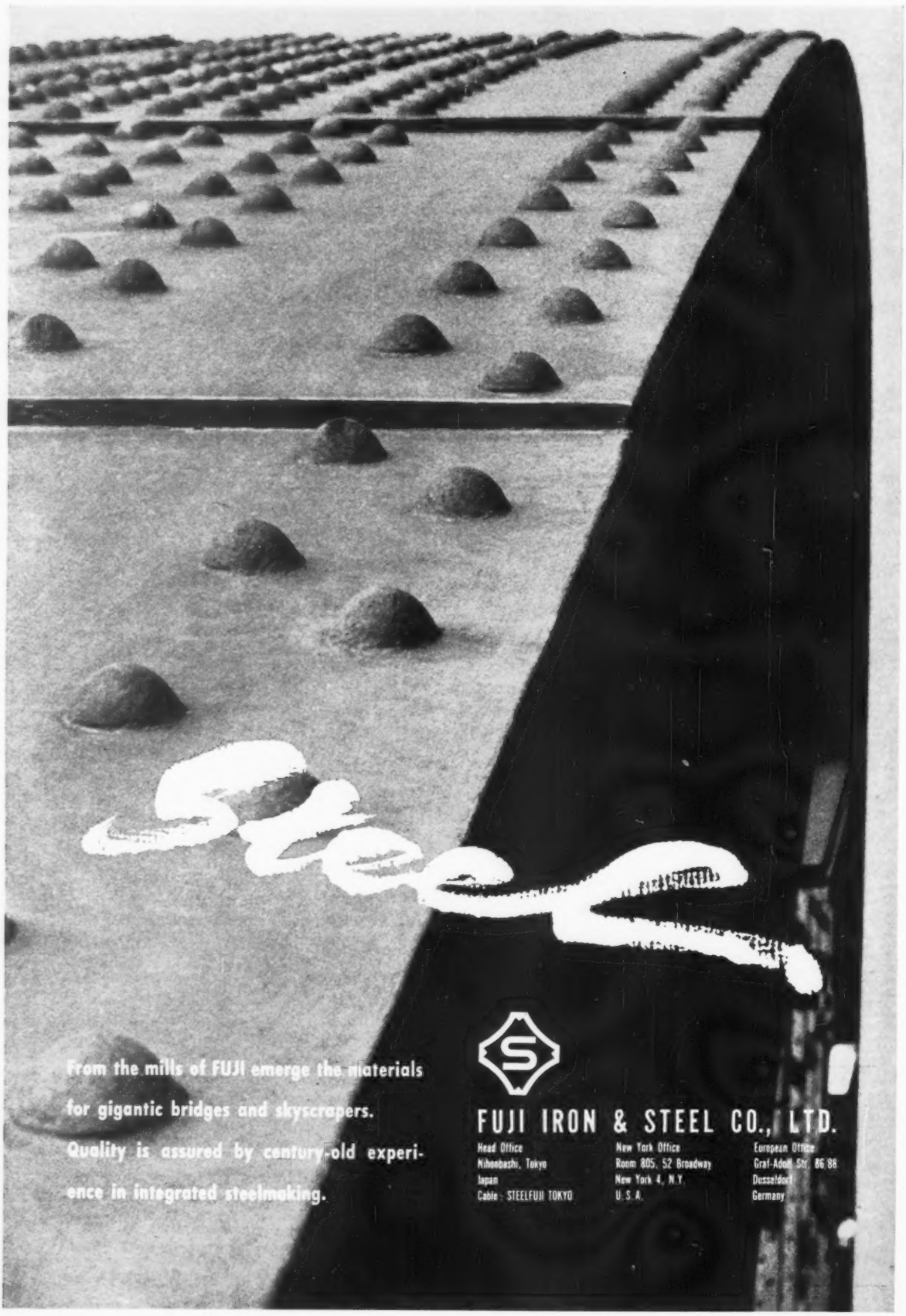
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$30.50	$30.50	$30.50	$39.50	$39.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	34.00	40.00	39.50
No. 1 Heavy Melt, Chicago	30.50	29.50	29.50	36.50	37.00
No. 1 Heavy Melt, Valley	32.50	32.50	32.50	41.50	38.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	31.50	38.50	35.00
No. 1 Heavy Melt, Buffalo	29.50	29.50	30.50	33.50	34.50
Rails, Rerolling, Chicago	49.50	49.50	49.50	59.50	57.00
No. 1 Cast, Chicago	40.50	40.50	42.50	52.50	43.50

COKE, Net Ton

Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25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Germany

Steel Prices

Mill prices as reported to STEEL, July 13, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 134, footnotes, page 136.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ..109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 .....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....110.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massilon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ..119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14 122.50
S.Duquesne,Pa. U5 .. 122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ..5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
Indiana Harbor,Ind. Y1 ..6.40
Jonhstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburgh,Calif. C11 ...7.20
Portsmouth O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill.U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5 W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S Chicago Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 .....5.30
Youngstown(27) R2 .....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2 Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 .....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2 W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 .....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded
(Including leaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 .....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12.R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria O W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S Chicago Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Sharon,Pa. S3 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa.M12.R2 .9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind.J5 L2 ...9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ...9.225
S Chicago,Ill. W14 ...9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025

Warren,O. C17 .....9.025
Waukegan, Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex. (26) T4 5.25
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 .5.675
Johnstown,Pa. B2 ...5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ....5.575
Franklin,Pa. (4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill. (8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.06
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown U5, Y1 ....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	**Cu Steel**	**Cu Fe**
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Wall Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W.Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton W. Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 ....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 .8.325
SparrowsPoint,Md. B2 ..7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2 M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M22.7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6 7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ..15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.10	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.96	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M22 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren O. B9, S3, T5..7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10 00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9 35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9 35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)		7.90	....	....
Niles,O. R2 (20-27 Ga.)		7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harbor Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.30
Fairless,Pa. U5 .....8.30
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1 8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg Calif. C11 ....8.85
SparrowsPoint,Md. B2..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$10.05
Irvin,Pa. U5 .....10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.06*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16 30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ..8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill. (1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....13.40
KansasCity,Mo. U3 ...12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ..13.45
Portsmouth,O. P12 ....12.65
Roebling, N.J. R5 ....12.95
SparrowsPt.,Md. B2 ..13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 ....12.65
Worcester,Mass. A7 ..12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W12 ...10.05
Pittsburg,Calif. C11 ..10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ..10.70
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Millbury,Mass.(12) N6..10.65
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.70
Portsmouth O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster.Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8..16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity Mo. S5 ....16.55
Kokomo,Ind. C16 ....16.30
Minnequa,Colo. C16 ...16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ..17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 ....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ..13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	....17.15
Roebling,N.J. R5	....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....12.35
Baltimore T6	.....12.65
Boston T6	.....12.65
Buffalo W12	.....12.35
Chicago W13	.....12.45
Cleveland A7	.....12.35
Crawfordsville,Ind. M8	.12.35
Dover,O. G6	.....12.35
Farrell,Pa. S3	.....12.35
Fostoria,O. S1	.....12.35
FranklinPark,Ill. T6	..12.45
Kokomo,Ind. C16	.....12.35
Massillon,O. R8	.....12.35
Milwaukee C23	.....12.55
Monessen,Pa. P7, P16	..12.35
Palmer,Mass. W12	....12.65
Pawtucket,R.I. N8	....12.65
Philadelphia P24	.....12.65
Riverdale,Ill. A1	.....12.45
Rome,N.Y. R6	.....12.35
Sharon,Pa. S3	.....12.35
Trenton,N.J. R5	.....12.65
Warren,O. B9	.....12.35
Worcester,Mass. A7,T6	.12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	...$.0.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	..$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	..175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	.$8.78
Atlanta A11	.....10.36
Bartonville,Ill. K4	.....8.88
Buffalo W12	.....10.26
Chicago W13	.....9.24
Crawfordsville,Ind. M8	..8.88
Donora,Pa. A7	.....8.78
Duluth A7	.....8.78
Fairfield,Ala. T2	.....8.78
Houston S5	.....10.51
Jacksonville,Fla. M8	...8.88
Johnstown,Pa. B2	.....8.78
Joliet,Ill. A7	.....8.78
KansasCity,Mo. S5	....10.51
Kokomo,Ind. C16	.....8.88
LosAngeles B3	.....9.44
Minnequa,Colo. C11	....9.02
Pittsburg,Calif. C11	....9.44
S.Chicago,Ill. R2	.....8.78
S.SanFrancisco C10	....9.94
SparrowsPt.,Md. B2	....8.88
Sterling,Ill.(37) N15	....8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	..$9.06
Atlanta A11	.....10.70
Bartonville,Ill. K4	.....9.16
Buffalo W12	.....10.60
Chicago W13	.....9.54
Crawfordsville,Ind. M8	..9.16
Donora,Pa. A7	.....9.06
Duluth A7	.....9.06
Fairfield,Ala. T2	.....9.06
Houston S5	.....10.85
Jacksonville,Fla. M8	...9.16
Johnstown,Pa. B2	.....9.06
Joliet,Ill. A7	.....9.06
KansasCity,Mo. S5	....10.85
Kokomo,Ind. C16	.....9.16
LosAngeles B3	.....9.75
Minnequa,Colo. C10	....9.30
Pittsburg,Calif. C11	....9.75
S.Chicago,Ill. R2	.....9.06
S.SanFrancisco C10	...10.26
SparrowsPt.,Md. B2	...9.16
Sterling,Ill.(37) N15	...9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	.$9.11
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....9.21
Buffalo W12	.....10.65
Chicago W13	.....9.59
Crawfordsville,Ind. M8	.9.21
Donora,Pa. A7	.....9.11
Duluth A7	.....9.11
Fairfield,Ala. T2	.....9.11
Houston S5	.....10.90
Jacksonville,Fla. M8	...9.21
Johnstown,Pa. B2	.....9.11
Joliet,Ill. A7	.....9.11
KansasCity,Mo. S5	....10.96
Kokomo,Ind. C16	.....9.21
LosAngeles B3	.....9.80
Minnequa,Colo. C10	....9.35
Pittsburg,Calif. C11	....9.80
S.Chicago,Ill. R2	.....9.11
S.SanFrancisco C10	...10.31
SparrowsPt.,Md. B2	....9.21
Sterling,Ill.(37) N15	...9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	...212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — Col.

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	..177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	...177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	.193••
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....197•
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198••
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	.....198••
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	.....198••
Monessen,Pa. P7	.....196§
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193••
S.SanFrancisco C10	....213•
SparrowsPoint,Md. B2	.198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	.....187••
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	.....191•
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192••
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	.....192•
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	.....192••
Pittsburg,Calif. C11	.....210†
Rankin,Pa. A7	.....187†
S.Chicago,Ill. R2	.....187••
Sterling,Ill.(7) N15	192

WIRE (16 gage) — An'ld Galv. Stone — Stone

Ala.City,Ala. R2	17.85 19.40••
Aliq'ppa,Pa. J5	..17.85 19.65
Bartonville Ill K4	..17.95 19.80
Cleveland A7	....17.85 ....
Craw'dville M8	17.95 19.80‡
Fostoria,O. S1	..18.35 19.90†
Houston S5	....18.10 19.65••
Jacksonville M8	18.95 19.80‡‡
Johnstown B2	..17.85 19.65§
Kan.City,Mo. S5	..18.10 ....
Kokomo C16	....17.95 19.50†
Minnequa C10	..18.10 19.65••
P'lm'r,Mass.W12	18.15 19.70†
Pitts.,Calif. C11	18.20 19.75†
S.SanFran. C10	18.20 19.75••
St'ling(37) N15	..17.95 19.80
SparrowsPt. B2	..17.95 19.75§
Waukegan A7	...17.85 19.40†
Worcester A7	...18.15 ....

WIRE, Merchant Quality (6 to 8 gage) — An'ld Galv.

Ala.City,Ala. R2	..9.00 9.55••
Aliquippa J5	....8.65 9.325§
Atlanta(48) A11	..9.00 9.75•
Bartonville(48) K4	9.85 19.90
Buffalo W12	....9.00 9.55†
Cleveland A7	.....9.00 ....
Crawfordsville M8	9.10 9.80‡‡
Donora,Pa. A7	...9.00 9.55†
Duluth A7	.....9.00 9.55†
Fairfield T2	....9.00 9.55†
Houston(48) S5	..9.25 9.80••
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	....9.00 9.55†
KansasCity(48)S5	9.25 9.80••
Kokomo(48) S16	..9.10 9.65†
LosAngeles B3	.9.95 10.625§
Minnequa C10	...9.25 9.80••
Monessen(48) P7	.8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	..9.95 10.50†
Rankin,Pa. A7	...9.00 9.55†
S.Chicago R2	....9.00 9.55••
S.SanFran. C10	.9.95 10.50••
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	.9.10 9.80
Struthers,O. Y1	..9.00 9.65†
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: •13.50c. †5c. ‡10c. ‡‡Less than 10c. ††10.50c. ‡‡‡11.00c. ••Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts. 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
•Bulk	50

•Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS, Fillister Head, Cap Screws, Coarse Thread:

Packages	+ 55
Bulk	+ 16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packages	+ 85
Bulk	+ 38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:

Packages	+ 5
Bulk	+ 19

Through 1 in. diam., longer than 6 in.:

Packages	+ 29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	6.725
Ensley,Ala. T2	5.75	5.65	6.725
Fairfield,Ala. T2	....	....	6.725
Gary,Ind. U5	5.75	5.65	....
Huntington,W.Va. C15	....	....	6.725
Johnstown,Pa. B2	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	6.725
Minnequa,Colo. C10	5.75	5.65	7.225
Steelton,Pa. B2	5.75	5.65	....
Williamsport,Pa. S19	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	.....6.875
Gary,Ind. U5	.....6.875
Lackawanna,N.Y. B2	..6.875
Minnequa,Colo. C10	...6.875
Seattle B3	.....7.025
Steelton,Pa. B2	.....6.875
Torrance,Calif. C11	...7.025

JOINT BARS

Bessemer,Pa. U5	.....7.25
Fairfield,Ala. T2	.....7.25
Joliet,Ill. U5	.....7.25
Lackawanna,N.Y. B2	..7.25
Minnequa,Colo. C10	....7.25
Steelton,Pa. B2	.....7.25

AXLES

Ind.Harbor,Ind. S13	...9.125
Johnstown,Pa. B2	....9.125

SCREW SPIKES

Lebanon,Pa. B2	.....15.10

TRACK BOLTS, Untreated

Cleveland R2	.....15.35
KansasCity,Mo. S5	....15.35
Lebanon,Pa. B2	.....15.35
Minnequa,Colo. C10	....15.35
Pittsburgh S44	.....15.35
Seattle B3	.....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	....10.10
Lebanon,Pa. B2	.....10.10
Minnequa,Colo. C10	....10.10
Pittsburgh J5	.....10.10
Seattle B3	.....10.60
S.Chicago,Ill. R2	.....10.10
Struthers,O. Y1	.....10.10
Youngstown R2	.....10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 3 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.49		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.21		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk. (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B3, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except; Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	7.32	10.20	10.95	52.00	8.34	7.95	10.65	15.95	7.91	7.51	10.13
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	7.32	9.88	11.14	56.18	8.46	8.16	11.25	16.06	8.30	7.75	10.37
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	61.27	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Memphis, Tenn.	9.84	10.05	....	....	11.24	9.92	12.74	....	10.33	10.12	11.41
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
Moline, Ill.	9.24	10.70	11.45	....	10.90	9.34	11.15	16.45	9.83	9.17	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	9.60	10.66	52.71	10.85	9.25	11.95	16.38	9.45	9.20	10.45
Pittsburgh	7.32	9.88	11.03	52.00	8.44	7.95	11.25	15.95	7.91	7.51	10.13
Portland, Oreg.	10.20	12.05	12.35	....	12.20	10.20	16.65	17.80	10.80	10.35	12.50
St. Louis	8.77	10.58	10.53	....	10.50	8.77	11.28	16.33	9.14	8.62	10.57
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.45	55.10	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.07	11.44	12.05	54.02	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash.	9.92	11.29	11.90	54.02	11.69	9.81	16.20	17.80	10.44	10.02	12.31

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. x 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1½ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 72-75%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-58%, Indian, 85-90¢, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5¼	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River: 100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	40.90
Bronze, filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver	61.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.35	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	6.50	6.35	6.35	6.70
Bright Common Wire Nails (‡)	8.50	7.40	7.40	7.25	7.65

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton. Palmerton, Pa. 21-23% Mn, $102.50. 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.1c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y.; freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 1% max, C 0.1% max). Ton lots 2" x D, $3.15 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b Langeloth and Washington, Pa.

STRAPS COILS ON THE DOUBLE

At Gary Steel Supply Co., Chicago, Acme Idea Man Art Hartley (left) views Idea No. S4-11.

Once a slow, laborious manual task, strapping of these slit coils is now a quick, easy operation. With the advent of an Acme Steel F4 Strapping Machine, the slit coil strapping line is completely automated. As a result, coil tying production is not only *doubled,* but manhours are reduced.

Formerly, two men with hand tools could strap only one slit coil per minute. Now just one man straps two per minute. And *every* strap is uniformly tensioned—from first to last.

Your Acme Idea Man is ready to help *you* profitably solve tying or unitizing problems. Call him, or mail the coupon for details.

ACME STEEL

IDEA LEADER IN STRAPPING

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Acme Steel Products Division
Dept. SBS-70
135th St. & Perry Ave.
Chicago 27, Ill.

Please send me Idea No. S4-11 and examples of how major companies in my field use Acme Steel Strapping.

*Name*_____

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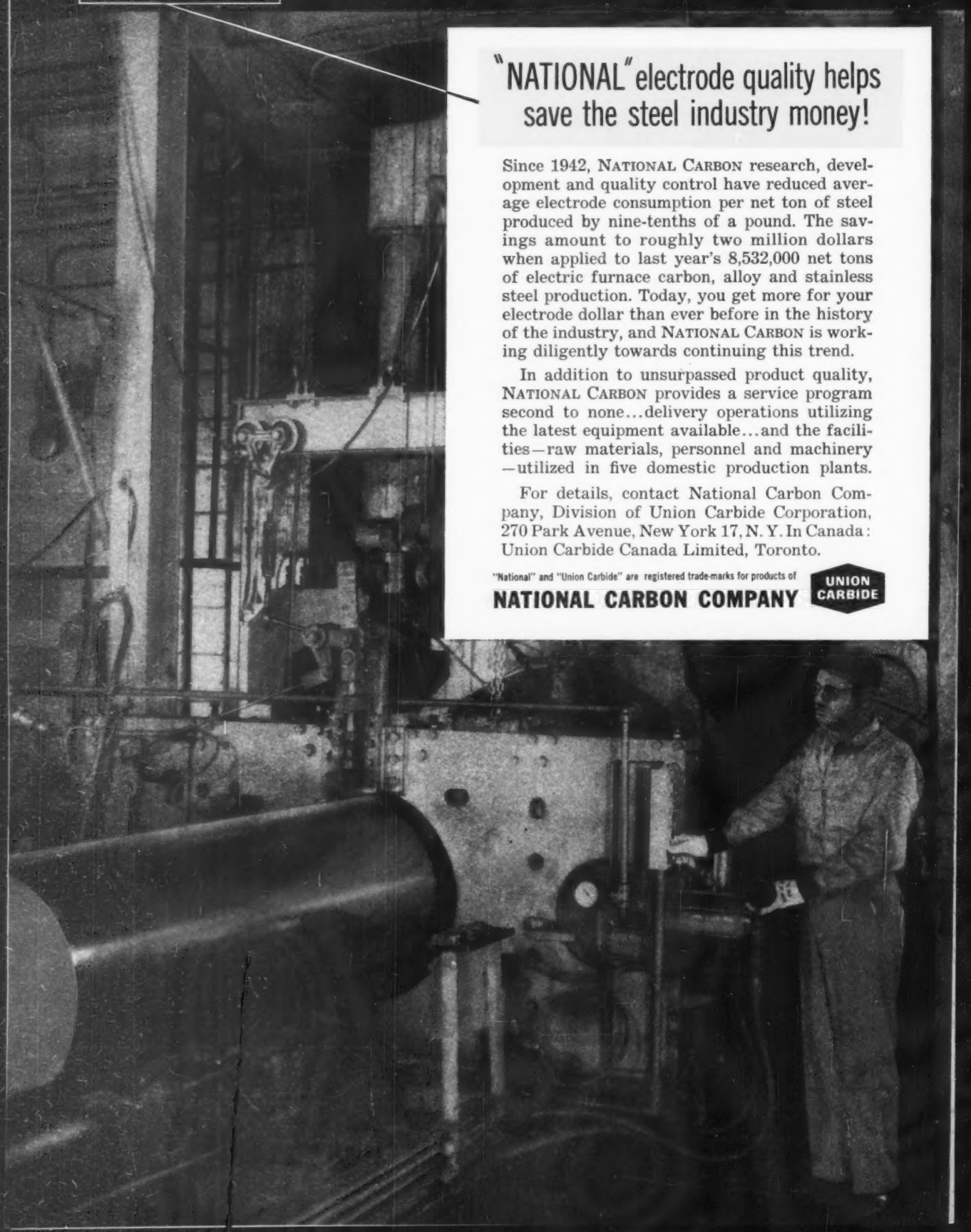
*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

MAJOR REASONS FOR SPECIFYING NATIONAL ELECTRODES...

QUALITY SERVICE · DELIVERY · FACILITIES!



"NATIONAL" electrode quality helps save the steel industry money!

Since 1942, NATIONAL CARBON research, development and quality control have reduced average electrode consumption per net ton of steel produced by nine-tenths of a pound. The savings amount to roughly two million dollars when applied to last year's 8,532,000 net tons of electric furnace carbon, alloy and stainless steel production. Today, you get more for your electrode dollar than ever before in the history of the industry, and NATIONAL CARBON is working diligently towards continuing this trend.

In addition to unsurpassed product quality, NATIONAL CARBON provides a service program second to none...delivery operations utilizing the latest equipment available...and the facilities—raw materials, personnel and machinery—utilized in five domestic production plants.

For details, contact National Carbon Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Limited, Toronto.

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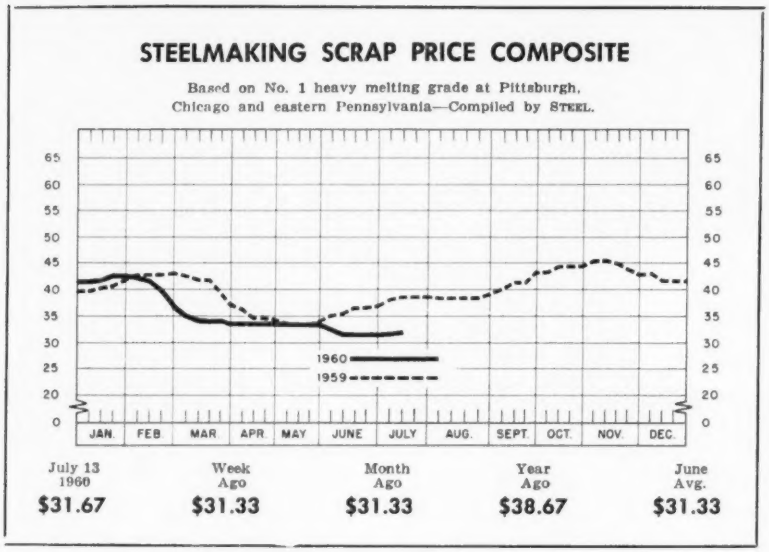
UNION CARBIDE



Scrap Index Rises on Light Buying

STEEL's composite on No. 1 heavy melting steel goes up 34 cents to $31.67, the first rise in market since January. Upturn accompanies postholiday pickup in steelmaking

Scrap Prices, Page 144

• **Chicago** — Prices on leading grades of open hearth scrap are up $1 a ton on the basis of new mill buying. Except for a flurry in late January, this is the first increase in the market since the end of the steel strike. Since November, No. 1 heavy melting industrial scrap has skidded $16 a ton—from $47 to $31. No. 1 railroad heavy melting has dropped a like amount, from $49 to $33. The only logical reasons for the current advance are the prospect of rising steelmaking operations in the weeks ahead and the fact that only 22 of the district's 43 blast furnaces are blowing.

• **Pittsburgh**—Speculative buying by brokers is giving the market a firmer tone. Prices paid for railroad scrap were mixed but mostly higher. No. 1 heavy melting, supported by export demand, jumped to $36 on the B&O list (vs. $34.50 last month). Wheels rose sharply. B&O got $49.40 (vs. $44 last month) and Pennsylvania Railroad, $49.90 (vs. $47.40 in June). In general, steel foundry grades are strong, iron foundry grades are weak, and unprepared material is unchanged.

• **Philadelphia**—Domestic demand continues sluggish. However, prices on the major grades of steel scrap are unchanged due to brisk trading for export. The only price change in the steel grades is a $2 a ton reduction in rail crops (2 ft and under) to $54-$55, delivered. The cast iron grades are showing further weakness, with drop broken machinery off $1 to $50, delivered, and malleable down $5 to $46.

• **New York**—Prices on the steelmaking grades continue unchanged, with lively export demand offsetting the lag in domestic buying. Quotations on the cast iron grades and stainless scrap specialties are easy.

• **Cleveland**—Steelmaking operations recovered here and in the Valley from the Fourth-of-July weekend slump, the Cleveland ingot rate rising 4 points to 46 per cent and the Valley rate going up 19 points to 32. The increase in operations generated a little more optimistic note in the scrap market, but not much change is expected until next month. Prices are unchanged, but they are nominal. Most traders think the market is on bottom; brokers report dealer resistance to buying offers at currently quoted prices.

A major steelmaker in the Valley placed an order for No. 1 industrial heavy melting steel at $34, which is $1 a ton under what it paid on a recent previous order.

• **Buffalo** — A leading consumer bought No. 2 bundles at $22 a ton, off $1 from the last purchase. The mill failed to buy any No. 2 heavy melting, so the price on that grade continues nominal. The mill did purchase some No. 1 heavy melting at the prevailing price, $29-$30, which represents a decline of $1 from the previous price paid by this mill.

• **Detroit**—The market is steady despite the sluggish demand. A small order was placed by Great Lakes Steel and this served to stabilize the situation.

• **Cincinnati**—Prices on the steelmaking grades are unchanged, with buying limited. Dealers are resisting lower prices, and the trade view is that the market now is on bottom.

• **St. Louis**—Scrapmen think prices may have touched bottom. Generally, it's felt that substantial improvement won't be in evidence until late next month, when the vacation season ends and manufacturing industry schedules rise.

• **Birmingham**—Prices on various steel grades are off $1 a ton, particularly No. 1 heavy melting, No. 2 heavy melting, bar crops and plate, and electric furnace material.

• **Seattle**—Prices are unchanged.

(Please turn to Page 149)

FOR SALE

One new Electric Arc Furnace Charging Bucket Including Bale
Type: Cable Operated—Clamshell
Capacity: 1486 Cu. ft. = 55 tons
Max Dia Closed: 17'-9"
Max Dia Opened: 18'-8"
Max Dia Bottom Opening 12'-6"
Distance from Eye of Bale to Bottom of Bucket Open and closed 14'-0"
Weight: 48,000 lbs.

Reply to Box #862, STEEL Penton Bldg., Cleveland 13, Ohio

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, July 13, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 13	$31.67
July 6	31.33
June Avg.	31.33
July 1959	38.45
July 1955	39.67

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
No. 1 factory bundles	35.00-36.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	18.00-19.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	37.00-38.00
3 ft and under	36.00-37.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	39.00-40.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	34.00-35.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	37.00-38.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 2 ft and under	*50.00-51.00*
Rails, 18 in. and under	*51.00-52.00*
Random rails	*46.00-47.00*
Angles, splice bars	45.00-46.00
Railroad specialties	*50.00-51.00*
Rails, rerolling	51.00-52.00

Stainless Steel Scrap

18-8 bundles & solids	200.00-205.00†
18-8 turnings	100.00-105.00†
430 bundles & solids	100.00-105.00†
430 turnings	50.00-55.00†

CHICAGO

No. 1 hvy melt., indus.	*31.00-32.00*
No. 1 hvy melt., dealer	*29.00-30.00*
No. 2 hvy melting	*27.00-28.00*
No. 1 factory bundles	*35.00-36.00*
No. 1 dealer bundles	*30.00-31.00*
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	*31.00-32.00*
No. 1 busheling, dealer	*29.00-30.00*
Machine shop turnings	13.00-14.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals, 3 ft	33.00-34.00
Punchings & plate scrap	35.00-36.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	34.00-35.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	45.00-46.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*33.00-34.00*
R.R. malleable	44.00-45.00
Rails, 2 ft and under	46.00-47.00
Rails, 18 in. and under	47.00-48.00
Angles, splice bars	40.00-41.00
Axles	49.00-50.00
Rails, rerolling	49.00-50.00

Stainless Steel Scrap

18-8 bundles, solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	14.00-15.00
No. 1 bundles	28.00-29.00
No. 2 bundles	12.50-13.50
No. 1 busheling	24.00-25.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00†
No. 2 heavy melting	23.00-24.00†
No. 1 factory bundles	32.00-33.00
No. 1 bundles	31.00-32.00†
No. 2 bundles	17.00-18.00†
No. 1 busheling	31.00-32.00†
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00†

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random length	44.00-45.00
Cast steel	38.00-39.00
No. 1 railroad cast	46.00-47.00
Railroad specialties	*43.00-44.00*
Angles, splice bars	45.00-46.00
Rails, rerolling	*53.00-54.00*

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00†
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	33.00-34.00†
No. 1 bundles	33.00-34.00†
No. 2 bundles	20.00-21.00†
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*

BUFFALO

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	25.00-26.00†
No. 1 bundles	29.00-30.00
No. 2 bundles	*21.00-22.00*
No. 1 busheling	29.00-30.00
Shovel turnings	17.00-18.00
Machine shop turnings	12.00-13.00
Cast iron borings	15.00-16.00
Low phos. structurals and plate, 2 ft and under	40.00-41.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	43.00-44.00
Rails, 3 ft and under	49.00-50.00
Railroad specialties	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	17.50-18.50
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos. 18 in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Heavy breakable cast	*31.00-32.00*
Charging box cast	36.00-37.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	51.00-52.00
Rails, random lengths	*43.00-44.00*

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	36.00
No. 2 bundles	20.00
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00
Machine shop turnings	15.00
Heavy turnings	28.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	40.00
Rail crop, 2 ft & under	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	38.00
Drop broken machinery	*50.00*
Malleable	*46.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips solids	165.00-170.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.00-24.50
No. 2 heavy melting	19.00-20.00
No. 1 bundles	24.00-24.50
No. 1 busheling	24.00-24.50
Machine shop turnings	6.00-7.00
Shovel turnings	9.00-10.00
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	28.00-29.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	9.00-10.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	*35.00-36.00*
Structurals & plate	35.00-36.00
Electric furnace bundles	32.00-33.00
Electric furnace:	
3 ft and under	31.00-32.00
3 ft and under	*32.00-33.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	46.00-47.00
Unstripped motor blocks	36.00-37.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Angles, splice bars	39.00-40.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	9.00†
Shovel turnings	11.00†

Cast Iron Grades

No. 1 cupola	44.00†
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	*36.00*
Clean auto cast	45.00†
Stove plate	36.00†

Railroad Scrap

No. 1 R.R. heavy melt.	31.00†
Rails, random lengths	38.00†
Rails, rerolling	*48.00*
Rails, 18 in. and under	41.00†
Angles, splice bars	41.00†

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	*31.00*
No. 2 heavy melting	*29.00*
No. 2 bundles	*18.00*
Machine shop turnings	*11.00-12.00*
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	*33.00-35.00*
Heavy breakable	*26.00*
Foundry malleable	31.00†
Unstripped motor blocks	*29.00-31.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*

LOS ANGELES

No. 1 heavy melting	*32.00*
No. 2 heavy melting	*29.00*
No. 1 bundles	*27.00*
No. 2 bundles	*17.00*
Machine shop turnings	*14.00*
Shovel turnings	*15.00*
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	42.00

Cast Iron Grades

No. 1 cupola	*43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-34.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00-38.00
No. 2 heavy melting	32.00-35.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	30.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	34.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy. melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

†Nominal.
‡F.o.b. Hamilton, Ont.

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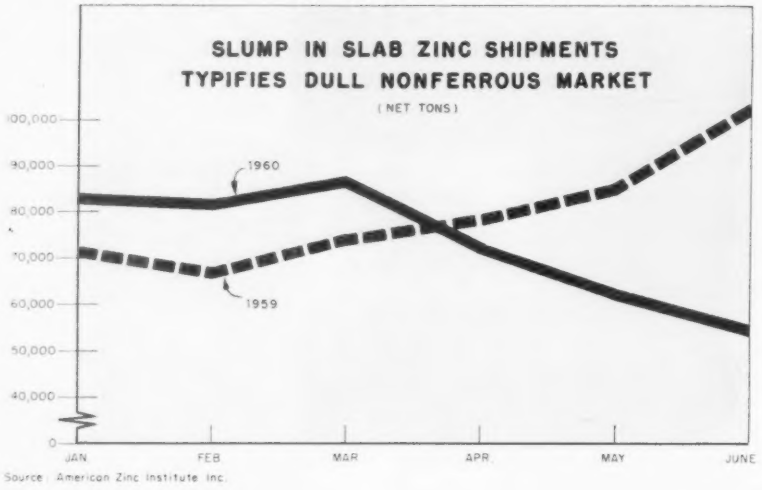


Source: American Zinc Institute Inc.

Premiums on Zinc Lowered

Developments in the Congo, Cuba, and the zinc market disrupt tranquility of midsummer metals market. The short term outlook: Adequate supplies, firm prices

Nonferrous Metal Prices, Pages 148 & 149

THIS is supposed to be the slow part of the summer—the time when plants close for vacations. And it is slow as far as sales are concerned.

Yet the nonferrous scene is boiling with developments. Weakness in sales here at home, turmoil in the Belgian Congo, and politics in Cuba have upset the normal tranquility of the season.

• **Zinc Makes the News** — Zinc made headlines last week as producers lowered premiums on special high grade by 0.25 cent a pound, on high grade by 0.15 cent. The move, which becomes effective for any order shipped on or after July 1, drops the special high grade price to 14.50 cents a pound and the high grade quotation to 14.35 cents.

The slash is a result of poor, even miserable, business in the two grades over the last few months. Brass mills, the best customers for high grade, have had their own sales problems. Special high grade producers have seen a sharp drop in demand for the diecasting material from automakers and appliance companies. Witness the rapid climb in producers' stocks of special high grade: From 12,500 tons at the first of January to 57,187 tons at the end of June.

Intensifying pressures for a lower price: Imports that have sold for 1 to 1.5 cents a pound less than domestic metal and the tight competitive situation which resulted in cases of lower premiums.

There's no doubt about it: The zinc market has been, and still is, in the doldrums. Look at the chart. You'll note that 1960 shipments of slab zinc have dropped from a high of 86,524 tons in March to a low of 54,075 tons in June. In the comparable period last year, sales were doing just the reverse, hitting the year's high of 102,162 tons in June.

Part of the disparity between 1959 and 1960 second quarter shipments can be explained this way: Last year, some major customers, like galvanizers, were running at capacity to produce as much material as possible before the steel strike hit. Others, like automakers, were laying in stocks to protect against a strike in zinc. This year, user stocks have been high and metal supply plentiful. Result: Zincmen are convinced shipments are far under consumption.

Sales should begin to perk up enough by late August to inject a little muscle into the market, metalmen believe. In the meantime, look for the prime western price of 13 cents a pound to hold.

• **Lead Sales Slow** — Lead, zinc's companion metal, isn't setting any sales records either. Producers expect improvement in late August and no change in price before then.

• **Blood Bath in Congo**—While zinc is taking its punishment at home, copper is being slapped around overseas. Of far reaching importance to the world's copper supply is what happens in the Belgian Congo. Late last week, native gangs, spearheaded by rebellious troops, were running amuck in the copper-rich Katanga Province.

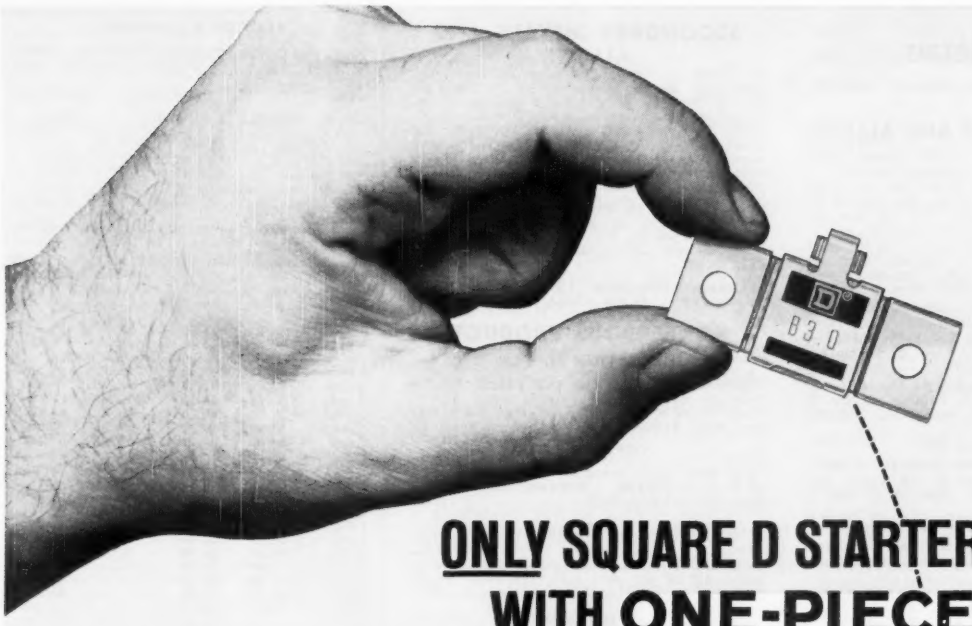
Union Miniere du Haut Katanga, operator of the lush copper properties that supply the European market with around 300,000 tons of metal yearly, ordered the mines evacuated after a score of its white personnel had been murdered. Supervisors and their families fled for the Northern Rhodesia border, leaving the mines almost deserted and production equipment unguarded. Later in the week, they started returning to work.

Native politicians immediately moved to declare Katanga Province a separate republic. At presstime, Belgian paratroopers were attempting to evacuate whites, and the central government had asked the U. S. for military assistance.

The length of the Congo turmoil will be the crucial factor to the U. S. copper user. European users have been laying in inventory in anticipation of just such an event, and considerable Katanga copper is believed to be stockpiled on the continent. So supplies look adequate for the present.

European prices have already moved up, which will undoubtedly attract U. S. copper. With the current slack in U. S. sales, this should not affect the domestic price or supply. A lengthy disruption in the Congo could bring a tightness

(*Please turn to Page* 149)



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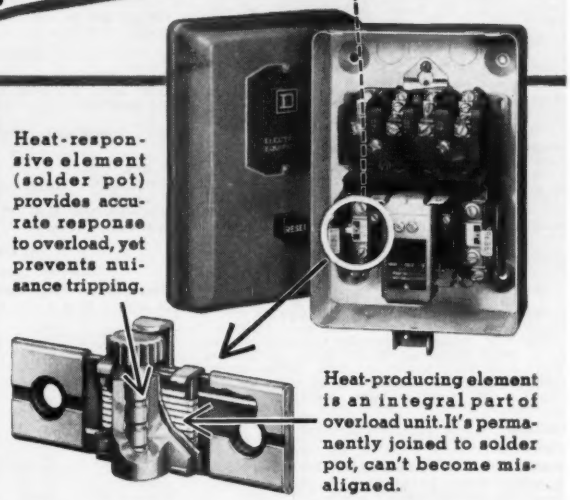
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PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 102.875; prompt, 102.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.35-4.50.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-24.25; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-24.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
70.5-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T151	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.10	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.00-2.25.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.25; No. 2 heavy copper and wire, 24.25; light copper, 22.00; refinery brass (60% copper) dry copper content, 23.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.25; No. 2 heavy copper and wire, 24.75; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 17.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.01; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 146)

in Free World copper, as well as in supplies of cobalt and radium and to a lesser extent in lead, zinc, germanium, and uranium.

• **Nicaro Nickel Arrives**—The one bright note in the sour Cuban symphony was struck last week with the first shipment of nickel since last winter from the U. S.-owned mining and processing complex at Nicaro. The 10 million lb of nickel oxide sinter set down on the docks in Philadelphia will swell stocks of Nicaro metal in this country to the 25 million-28 million lb range —close to a year's supply.

It marks the first time a loaded ship has left Nicaro since the Castro government began to enforce a 25 per cent tax on metal exports. State Department officials told STEEL they have struck an agreement with Cuba to allow untaxed shipments of Nicaro nickel while negotiations on the fate of the project are underway.

Scrap . . .

(*Concluded from Page* 143)

Dealers say the market lacks "appetite." Summer mill curtailments for maintenance and vacations have reduced order volume noticeably.

• **San Francisco**—Exports are taking up the "slack" in the steel scrap market here. A little buying by the mills for immediate needs is reported.

• **Los Angeles** — Except for shipments to Japan, the market is featureless.

Pig Iron . . .

Pig Iron Prices, Page 138

Merchant pig iron business probably reached its low point of the year earlier this month. From now through Labor Day there should be a gradual gain; after that date, trading should pick up appreciably.

There is an oversupply of merchant iron. Eastern seaboard production is at a standstill, now that the Birdsboro, Pa., stack has been blown out. That furnace and the other few remaining seaboard merchant producers have stocks to take care of customers for a considerable time. Certain inland producers who ship into the East are still in operation.

Plates . . .

Plate Prices, Page 133

Platemakers anticipate little change in sluggish market conditions over the next few weeks. There seems little likelihood consumer inventories will be worked down substantially until after the vacation season.

The service centers and plate and boiler shops still have substantial stocks. That is not the case with the railroads, but there are no indications of any early stepup in car construction and heavy repairs to

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UPSETTERS

7" & 8" Ajax horiz. upsetting & forging machines. Mfg. 1943, air clutch, excellent cond. Sacrifice for prompt removal.

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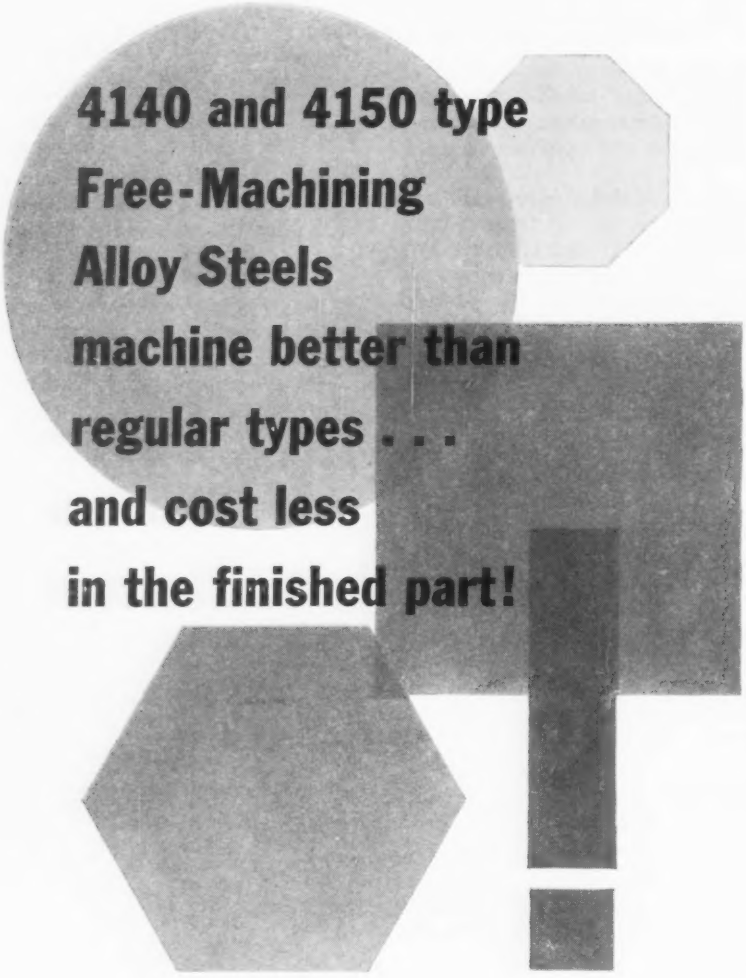
1957 Clay, Detroit 11. TRinity 2-1270

Help Wanted

Established West Coast firm wants general superintendent with adequate experience in all phases of bar mill operations including operation of electric furnace. Submit full resume, salary expected to Box 860, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

PLANT MANAGER—16 years experience in Plant Management, Production Control, Accounting Problems, Manufacturing Development, etc. Small manufacturing plant preferred. Married, family. Write Box 861, STEEL, Penton Bldg., Cleveland 13, Ohio.



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Wheelock, Lovejoy, for many years the pioneer in the development and application of 4140 and 4150 type free-machining alloy steels, offers you the most extensive stocks anywhere, in all W-L warehouses.

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"The Alloy Steel Center"

WHEELOCK, LOVEJOY & COMPANY, INC.
132 Sidney Street, Cambridge 39, Mass.

STEEL SERVICE CENTER INSTITUTE

cause much new buying. More shipwork is in sight, but it won't mean too much in the way of new tonnage for a while.

Prices to Jobbers Cut On Standard, Line Pipe

Leading producers of standard and line pipe have reduced their prices to distributors about 2 per cent, raising the functional discount from 3 to 5 per cent. The reduction became effective July 1 and is reported to have been taken to combat competition from brass, copper, and plastic pipe, as well as imported tubular goods.

The cut in the jobber prices on tubular goods follows recent downward adjustments at the mill level in quotations on wire products, reinforcing bars, and light gage can-making tin plate, and sharp cuts in published steel service center prices.

Pressure and mechanical tubing producers say demand for their products hasn't improved. Many had hoped that July would bring an upturn. Production facilities are now being operated at about 50 per cent of capacity.

Tool Steel . . .

Tool Steel Prices, Page 137

Shipments of tool steels (excluding hollow drill steel) in May totaled 7610 net tons, reports the American Iron & Steel Institute. That was down from April shipments of 8098 tons, and was off sharply from the 10,009 tons shipped in May, 1959.

The movement during the first five months this year was 45,917 tons, up noticeably from the 42,809 tons moved in the like period of last year.

Distributors . . .

Distributors feel that the business cycle is reaching bottom and expect a modest improvement in August. They anticipate an appreciable gain after the vacation season.

Operators of service centers have heavy stocks. Their buying for replacement is on the basis of retaining their favorable stock position.

Competition remains keen, and some downward revisions in prices have been posted.

Advertising Index

Acme Chain Corporation 6
Acme-Newport Steel Co. 122
Acme Steel Co., Acme Steel Products Division 141
Allegheny Ludlum Steel Corporation, Carmet Division 77
American Cast Iron Pipe Co., Special Products Division 60
American Steel & Wire Division, United States Steel Corporation 25, 26, 27, 28, 29, 30
Arcos Corporation 114, 115
Armco Steel Corporation 46

Babcock & Wilcox Co., The, Tubular Products Division ..... Inside Front Cover
Bailey, William M., Co. 95
Bayonne Bolt & Nut Corporation 127
Bethlehem Steel Co. 1
Bliss, E. W., Co., Mackintosh-Hemphill Division 7
Buffalo Forge Co. 34

Calumet & Hecla, Inc., Wolverine Tube Division ..... Inside Back Cover
Capewell Manufacturing Co., The 73
Clad-Rex Division of Simoniz Co. 98
Cleveland Crane & Engineering Co., The 31
Coffing Hoist Division, Duff-Norton Co. 10
Colorado Fuel & Iron Corporation, The 39
Columbia-Geneva Steel Division, United States Steel Corporation 11
Cone-Drive Gears Division, Michigan Tool Co. 127
Continental Steel Corporation 111

Diamond Manufacturing Co. 113
Diamond Power Specialty Corporation, Electronics Division 36
Dow Chemical Co., The 12, 13
Duff-Norton Co., Coffing Hoist Division 10

Fate-Root-Heath Co., The 93
Fuji Iron & Steel Co., Ltd. 132

Gas Atmospheres, Inc. 112
General Motors Corporation, Hyatt Bearings Division 66
General Motors Corporation, New Departure Division 69
General Motors Corporation, Saginaw Steering Gear Division 79
Gleason Works 97
Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 4

Heresite & Chemical Co. 120
Hyatt Bearings Division, General Motors Corporation 66

Ingersoll Milling Machine Co., The 59
Ingersoll-Rand 40

Jones & Laughlin Steel Corporation, Stainless & Strip Division 118, 119

Keystone Steel & Wire Co. 35
Kinnear Mfg. Co., The 108

Lincoln Electric Co., The 2, 3
Lindberg Engineering Co. 32, 33
Luria Brothers & Co., Inc. 145

McKay Machine Co. 48, 49

Machine Tool Exposition, The 124
Mackintosh-Hemphill Division of E. W. Bliss Co. 7
Marchant, Geo. F., Co. 113
Mesta Machine Co. ..... Back Cover
Michigan Tool Co., Cone-Drive Gears Division 127
Midland-Ross Corporation, Surface Combustion Division 65
Mobil Oil Co. 22, 23
Mundt, Charles, & Sons 151

National Carbon Co., Division of Union Carbide Corporation 142
National Machine Tool Builders Association 124
New Britain Machine Co., The, New Britain-Gridley Machine Division 109, 110
New Departure Division, General Motors Corporation 69
Norton Co., Machine Tool Division 37

Ohio Steel Foundry Co., The 74

Pacific Industrial Mfg. Co. 24
Pacific Press & Shear Corporation 24
Penn Metal Co., Inc. 103
Philadelphia Gear Corporation 84

Republic Steel Corporation 14, 15
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 39
Rolled Alloys, Inc. 16
Rowe Machinery & Manufacturing Co., Inc. 121

Saginaw Steering Gear Division, General Motors Corporation 79
Simoniz Co., Clad-Rex Division 98
Somers Brass Co., Inc. 126
Square D Co. 147
Steel Service Center Institute 21
Sun Shipbuilding & Dry Dock Co. 38
Surface Combustion, A Division of Midland-Ross Corporation 65

Tennessee Coal & Iron Division, United States Steel Corporation 11
Thomas Flexible Coupling Co. 129
Timken Roller Bearing Co., The, Steel & Tube Division 70
Torrington Co., The 45
Tube Methods, Inc. 72

Union Carbide Corporation, National Carbon Division 142
United States Steel Corporation, Subsidiaries 11, 25, 26, 27, 28, 29, 30, 82, 83, 106
United States Steel Export Co. 11
Universal Atlas Cement Division, United States Steel Corporation 106

Vaughn Machinery Co., The 100, 101

Ward Steel Co. 126
Washington Steel Corporation 128
Weinstein Co. 149
Wender Presses Inc. 149
Wheelabrator Corporation 116, 117
Wheelock, Lovejoy & Co., Inc. 150
Wheland Co., The 126
Wilson, Lee, Engineering Co., Inc. 8, 9
Wolverine Tube Division, Calumet & Hecla, Inc. ..... Inside Back Cover
Wrought Washer Mfg. Co. 50

~ ~ ~

Table of Contents
Facing Inside Front Cover
Classified Advertising, Page 149

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Send for Illustrated Catalog

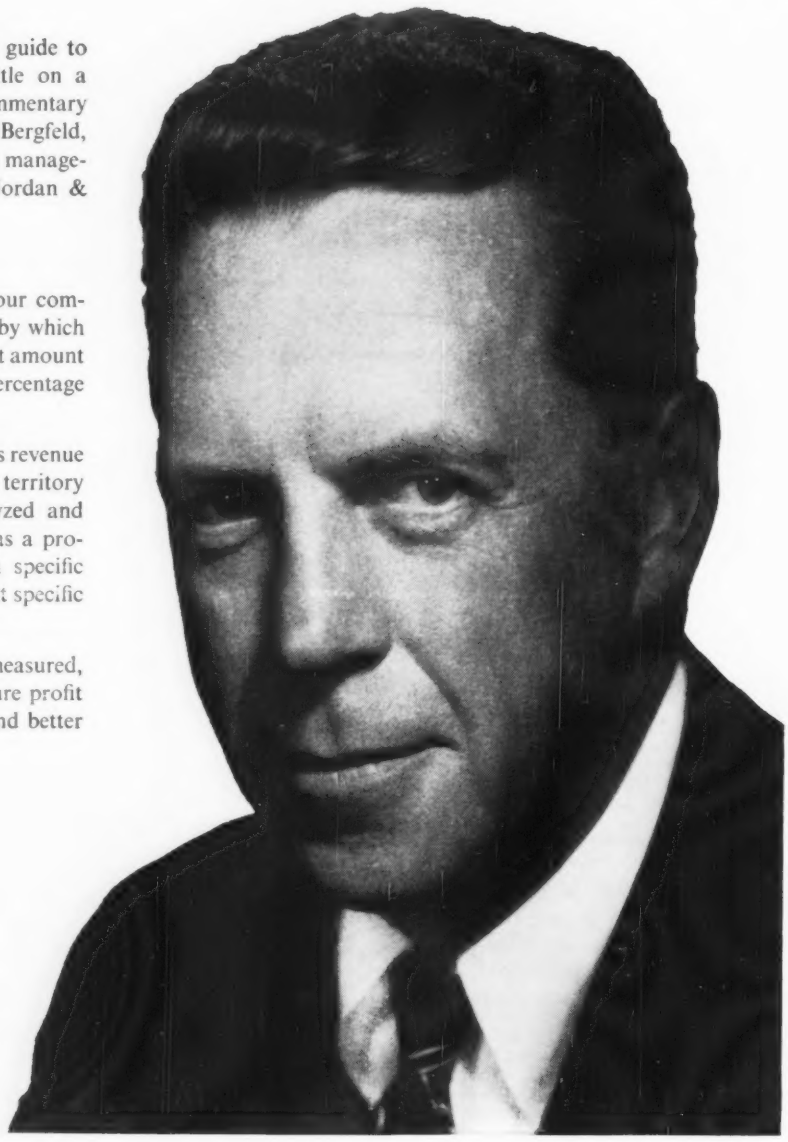
"What's so bad about basing the ad budget on last year's shipments?"

Management men, seeking a reliable guide to advertising appropriations, often settle on a percentage of sales. The following commentary on this practice was written by A. J. Bergfeld, President of the internationally known management consultant firm of Stevenson, Jordan & Harrison, Inc.

"Past practices of your own or of your competitors will produce no magic ratios by which you can either judge or budget the right amount of advertising automatically as a percentage of past sales.

"Plans for increasing sales volume, sales revenue and resulting profits by product and by territory or by divisions, can better be analyzed and approved by considering advertising as a programmed cost to be associated with specific profit plans and to be measured against specific results.

"Programming advertising costs as a measured, reasoned and integrated part of a future profit plan usually results in a better plan and better actual future profits."



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An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PHOENIX, PITTSBURGH, PORTLAND, ROCHESTER, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., TULSA, YOUNGSTOWN.

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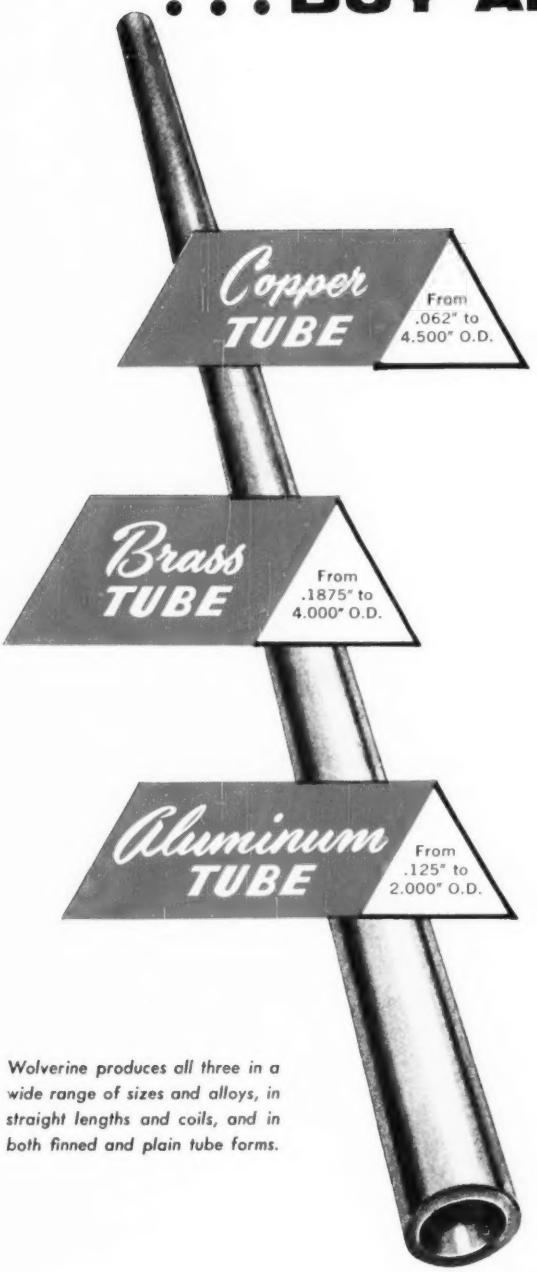

Wolverine produces all three in a wide range of sizes and alloys, in straight lengths and coils, and in both finned and plain tube forms.

When you're in the market for copper, brass or aluminum tube you can save time by making Wolverine your "buy" word. You obtain the product you need—made the way you want it—packaged to your exact requirements—and delivered when you want it.

Anticipating customer demands, and having the equipment, know-how and skilled employees needed to meet those demands, are all part of Wolverine's Tubemanship program. Wolverine customers can avail themselves of a wide range of specialized services in addition to various types of tubing.

Wolverine, for example, maintains complete fabrication facilities—is able to fin, spin, bend, coil—in short to do just about anything tubing customers require. From Wolverine's constant research program has come tubing specially designed to help solve the problems of such complex industries as refining, petro-chemical and petroleum processing, refrigeration and air conditioning—to name but a few.

▲ ▲ ▲

For your convenience Wolverine maintains sales offices in 33 American cities. Complete information can be found in Wolverine's General Products Catalog. Write for your copy—TODAY.

J-8894

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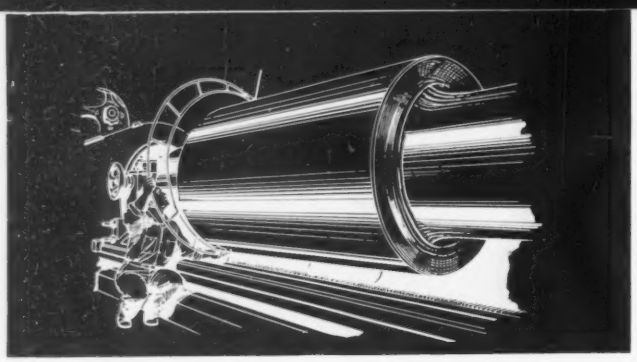

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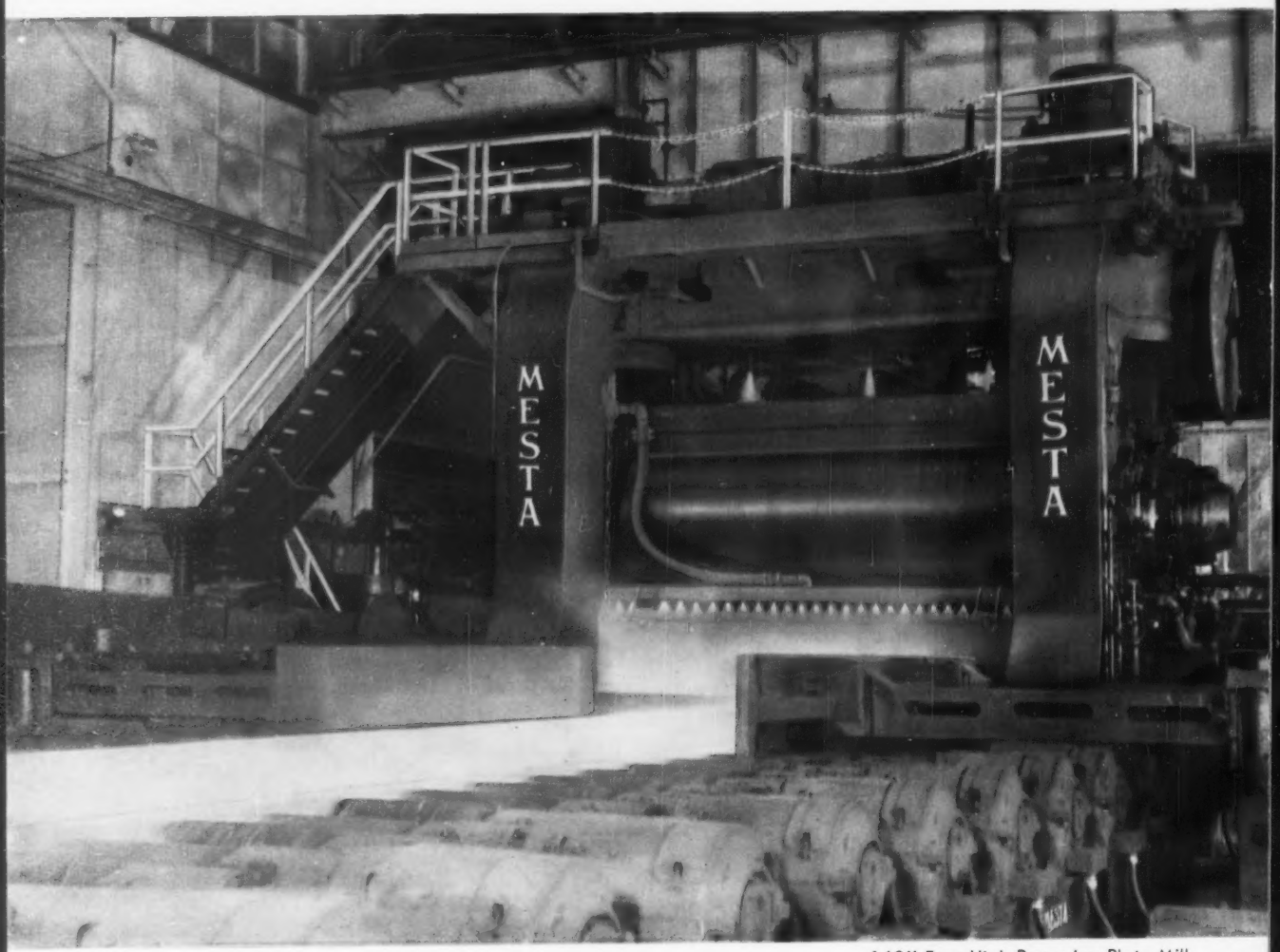

160" Four-High Reversing Plate Mill

MESTA *Machine Company*

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